MAY • 194

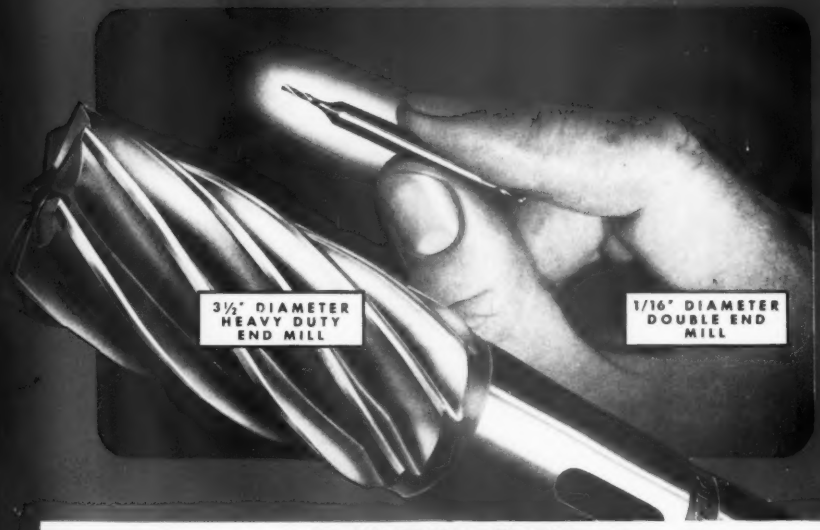
TOOL & DIE JOURNAL

TOOLING and PRODUCTION

BOTH of THESE

ARE REGULARLY-STOCKED

CATALOG-PRICED



Standard **PUTNAM** *Hi-Speed*

END MILLS

EXTREMES in size—yes, but they illustrate the range and completeness of the Putnam line which now comprises over 800 different standard end mill items. Whatever the type and size end mill required, you can depend on speedy delivery from fully-maintained Putnam Distributor stocks . . . *and at no premium price.*

You can depend, too, on maximum performance and trouble-free service from faster-cutting, long-lived Putnam End Mills.

New complete Putnam catalog free if requested on your company letterhead.

PTC

PUTNAM

TOOL COMPANY

2985 CHARLEVOIX AVENUE • DETROIT 7, MICHIGAN

What jobs have you for CARMET to do?

Special Blanks made from CARMET CARBIDES

Take a look, above, at a few of the many preforming jobs we do with Carmet—then tell us where we can help *you* to utilize the great wear-resistance of sintered carbides. The point is: we have an entirely complete line of Carmet carbide cutting tools and blanks, but we also specialize in preformed carbide machine parts of practically any size and shape—gage blanks, bushings, die parts, etc.—furnished either "as formed" or finish-ground to exacting tolerances. ● Let us work with you—*call for an Allegheny Ludlum Tool Engineer.*

ADDRESS DEPT. TD-70

Allegheny Ludlum Steel Corporation

CARBIDE ALLOYS DIVISION, Ferndale (Detroit) Michigan

Add this Time Saver to Your Equipment—

"HARDSTEEL" DRILL

The drill that drills hardened steels—without annealing.

When last minute changes come through on hardened parts and dies—drill without annealing using "HARDSTEEL" drills—and save time.

When parts must positively match at assembly—harden first, then drill with "HARDSTEEL" drills—and save time.

When case hardened steels must be drilled, use "HARDSTEEL" drills to get through the case—and save time.

When holes must be drilled in any work hardening steel or in special tools made of fully hardened steel—use "HARDSTEEL" drills and save time.

Yes, "HARDSTEEL" drills, made of special material and to a special design eliminate all annealing and the distortion usually caused by rehardening. They work on steels hardened by any process to 40 Rockwell "C" or harder.

The "HARDSTEEL" Operators Manual will give you many tips on how this well known tool can save time and material in your plant. Copy free on request.

You Harden it—We'll drill it—with "HARDSTEEL"

"HARDSTEEL" Tool bits make faster, deeper cuts on steels and non-ferrous alloys.

BLACK DRILL CO., ***Division Black Industries***
1390 East 222nd Street **Cleveland 17, Ohio**

"HARDSTEEL" DRILLS • TOOL BITS SPECIALS

TOOL & DIE JOURNAL

Editorial and Publication Offices
1975 LEE ROAD • CLEVELAND 18, OHIO

CONTENTS

Vol. XIV, No. 2 • May, 1948

Editorial	51
Feature Articles	52
Inform-A-Gram	82A
Advertisers Index	83
Progress-on-Parade	108
Publication Previews	125
Classified Advertising	140
Contract Tooling and Production	144

EDITORIAL STAFF

E. Willard Pennington.....Editor
Carl F. Benner.....Assistant Editor
Albert W. Ehlers.....Contributing Editor
Katherine A. Grinnell....Editorial Assistant

PUBLISHER

George J. Huebner

J. K. Gillam.....Assistant Publisher

CBI

Controlled Circulation—CBI Coverage

Tool & Die Journal is published monthly for those industry key men who constitute, in each plant, the Cycle of Buying Influence—CBI—and who are responsible for the design, manufacture and use of production tooling.

Subscription rate: To Schools, Libraries, Students and other than CBI, $4.00 per year. Single copies fifty cents.

Copyright 1948 by Geo. J. Huebner and R. R. Huebner. Acceptance under the Act of June 5, 1934, authorized October 22, 1942

REGIONAL OFFICES

Altadena, Calif. .....M. D. Pugh
2721 N. Marengo Ave., SYcamore 7-2894
Chicago 2.....L. B. Hammond
E. T. Elington
30 N. LaSalle St., RAndolph 1843
Cleveland 18.....Ray L. Huebner
1975 Lee Road, FA 4040
Detroit 2.....R. F. Pickrell
314 Stephenson Bldg., TRinity 1-0790
New England.....Herman T. Pierik
86 Weybosset St., Providence 3
GAspee 5275
New York 17.....H. Thayer Heaton
415 Lexington Ave., MUrray Hill 2-1647

HUEBNER PUBLICATIONS

Tool & Die Journal · Industrial Plastics
"Die Designing and Estimating"
"Plastics Molds"
The Know-How Library

George J. Huebner.....Editor-in-Chief
S. F. Marino....Sales Promotion Manager
R. L. Huebner..Advertising Sales Manager
M. J. Cifani.....Manager, Contracts
E. O. Hadden.....Chief Accountant
J. S. Livermore.....Production Manager
M. Hritz.....Staff Artist
Robert R. Scott.....Circulation Mgr.

Die Designers Specify

HOLO-KROME

fibre forged

SOCKET HEAD INTERNAL WRENCHING **STRIPPER BOLTS**

. . . THE BETTER FASTENING METHOD

STRIPPER BOLTS are used to attach the Stripper to the punch in Die Work and for attaching cams, links, levers and oscillating machine parts. H-K Socket Head Stripper Bolts may be set up tightly in close corners. More turns on the key may be made in restricted working areas. It's the Internal Wrenching!

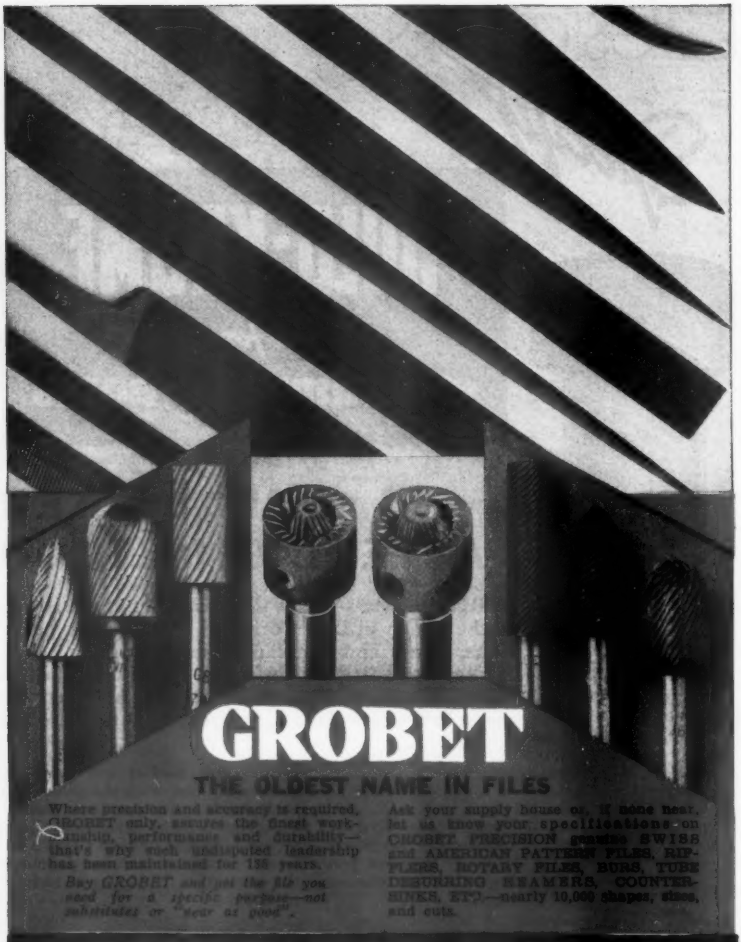
Your Holo-Krome Industrial Distributor is ready to serve you from his warehouse stock.

Heads and bodies are perfectly concentric one with the other and with the threaded portion. Bodies are ground. The threads are perfect in lead and held to Class 3 fit. Scientific heat treatment develops the utmost in strength and fatigue resistance.

THE HOLO-KROME SCREW CORP.

HARTFORD 10, CONN., U.S.A.

SEE ADVERTISERS INDEX, PAGE 83, FOR KEY NUMBERS


GROBET
THE OLDEST NAME IN FILES
Where precision and accuracy is required, GROBET only, assures the finest workmanship, performance and durability—that's why such undisputed leadership has been maintained for 138 years.
Buy GROBET and get the file you need for a specific purpose—not substitutes or "near as good".
Ask your supply house or, if none near, let us know your specifications on GROBET PRECISION genuine SWISS and AMERICAN PATTERN FILES, RIFFLERS, ROTARY FILES, BURS, TUBE DEBURRING REAMERS, COUNTERSINKS, ETC.—nearly 10,000 shapes, sizes, and cuts.

GROBET FILE CO. of AMERICA

421 Canal Street 1812 F. L. GROBET **New York 13, N. Y.**

IMPORTERS OF GROBET SWISS FILES — MFRS. OF GROBET ROTARY FILES

Plants: New York • Chicago

PLEASE USE INFORM-A-GRAM FOR PRODUCT INFORMATION

Keep the CENTER

with
Anti-Scoring
LUBRICANT

Actual tests prove that CMD Anti-Scoring Lubricant will not break and cause scoring or metal-to-metal contact—even under pressures exceeding 50,000 pounds per square inch. Reduce operating costs—eliminate unnecessary waste and danger—give your tools and equipment the best anti-scoring protection available—CMD Center Point lubricants. Write for FREE SAMPLE kit and catalog!

CMD Helical Groove LATHE CENTER
(*shown above*)
gives top performance —under severest shop conditions. The groove carries oil right to the point. Center lasts longer—work stays cooler.

MAIL COUPON NOW!

CHICAGO MANUFACTURING & DISTRIBUTING CO.
Dept. 5-TDJ, 1928 West 46th St., Chicago 9, Ill.

Without obligation please send us a free sample kit of one tube of CMD Center Point Lube and one tube of CMD Center Point Oil. Also, send Catalog describing CMD Helical Groove Centers.

NAME.....

FIRM NAME.....

ADDRESS.....

SEE ADVERTISERS INDEX, PAGE 83, FOR KEY NUMBERS

✱ A Hogging Demonstration

HOGGING!

No shaper hogs off metal without power at the cutting tool or without rigidity or without an overall ability to stand the gaff.

Cincinnati Heavy Duty Shapers, outstanding for many years in power, stamina and sustained performance, are today more powerful and more rigid than before.

The reliable performance of Cincinnati Heavy Duty Shapers means profit in the shop.

Write for catalog N-3 on the complete line of Cincinnati Shapers.

✱This Cincinnati Heavy Duty Shaper operated for the 10 days of the Machine Tool Show on a 2" depth of cut, .030" feed, and nine strokes per minute—in 1020 Steel to show the remarkable cutting capacity and rigidity of Cincinnati Shapers.

THE CINCINNATI SHAPER CO.

CINCINNATI 25, OHIO U.S.A.

SHAPERS · SHEARS · BRAKES

TIMKEN® GRAPHITIC TOOL STEELS MACHINE FASTER AND BETTER

One of five big reasons why Timken graphitic tool steels make better tools, dies, and gages

BECAUSE Timken graphitic tool steels contain particles of free graphite, they machine faster than other tool steels. Many manufacturers have cut machining time and have gotten better surface finish by switching to Timken graphitic steels!

Besides speeding production, Timken graphitic tool steels help improve product quality. The presence of free graphite and diamond-hard carbides in the structure gives Timken graphitic tool steels a unique ability to retain lubricants and stubborn resistance to wear and abrasion. They also have excellent non-seizing qualities . . . good stability . . . less tendency to scuff and score . . . uniform response to heat treatment.

These features are basic to all Timken graphitic tool steels—Graph-Mo, Graph-Tung, Graph-Al, Graph-Sil, Graph-M.N.S. And each of these analyses has special advantages for particular applications.

To get full details, write for a free copy of our 48-page, illustrated booklet "Timken Graphitic Tool Steels". The Timken Roller Bearing Company, Steel and Tube Division, Canton 6, Ohio. Cable address: "TIMROSCO".

YEARS AHEAD—THROUGH EXPERIENCE AND RESEARCH

Specialists in alloy steel—including hot rolled and cold finished alloy steel bars—a complete range of stainless, graphitic and standard tool analyses—and alloy and stainless seamless steel tubing.

SEE ADVERTISERS INDEX, PAGE 83, FOR KEY NUMBERS

Precision within reach of everyone

When gage blocks are readily available guesswork in the range below .001″ is minimized. Production difficulties are avoided and costs are reduced.

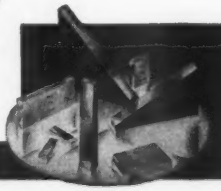
Place Webber Gage Blocks within easy reach, two or more sets if necessary with instructions to use them instantly whenever doubt arises.

The cost is now lower than ever before

WEBBER GAGE COMPANY, 12903 Triskett Rd., Cleveland 11, Ohio

WEBBER MAKES PRECISION GAGE BLOCKS EXCLUSIVELY

- ★ Gage Block Sets in Steps of .00005″
- ★ Individual Special Size Blocks.
- ★ Heavy Duty Gage Blocks.
- ★ Angle Gage Blocks in Steps of one second.
- ★ Carblox (Carbide) Wear Gages.

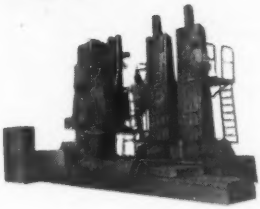


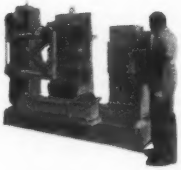
Webber
PRECISION
GAGE BLOCKS

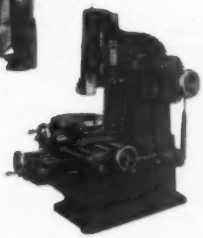
PLEASE USE INFORM-A-GRAM FOR PRODUCT INFORMATION

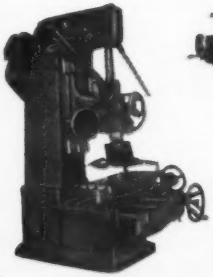
Now one source supplies everything you need

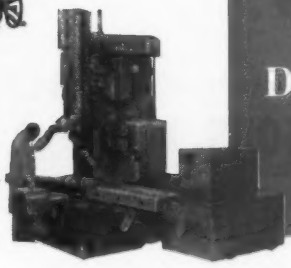
to make any kind of die or mold











From a single source — Pratt & Whitney — flows everything you need to make any kind of die or mold of any type or size. The fact that it's *Pratt & Whitney* means you get *precision equipment* of right design produced by skilled craftsmen working to a single high standard of precision and quality. And the fact that Pratt & Whitney is the *single source* means you get *unified responsibility* for the performance of machines and equipment, better results at lower cost, and no buck-passing when you need help. Write for detailed literature. No obligation, of course.

1. DIE SINKERS — Plain and Universal — for making original dies and molds by conventional methods, from drawings or prints.
2. KELLER MACHINES, for making original dies and molds from master forms, using automatic tracer control. In seven sizes up to 12' x 6' capacity.
3. AUTOMATIC DUPLICATING MACHINES, for duplicating small and medium-large dies and molds automatically and economically.
4. VERTICAL SHAPERS, for shaping contours and reliefs in blanking, trimming, drawing, and piercing dies, punches, and strippers.
5. JIG BORERS, for precision-boring of punch and die sets and intricate molds and dies, of all kinds.
6. JIG GRINDER, for relocating and finish-grinding straight or tapered holes to "tenths," in hardened steel. (First shown at the '47 Machine Tool Show.)
7. KELLERFLEX MACHINES — flexible shaft equipment for efficient finishing of dies and molds. Both multi-speed and direct drive types, in 14 models.

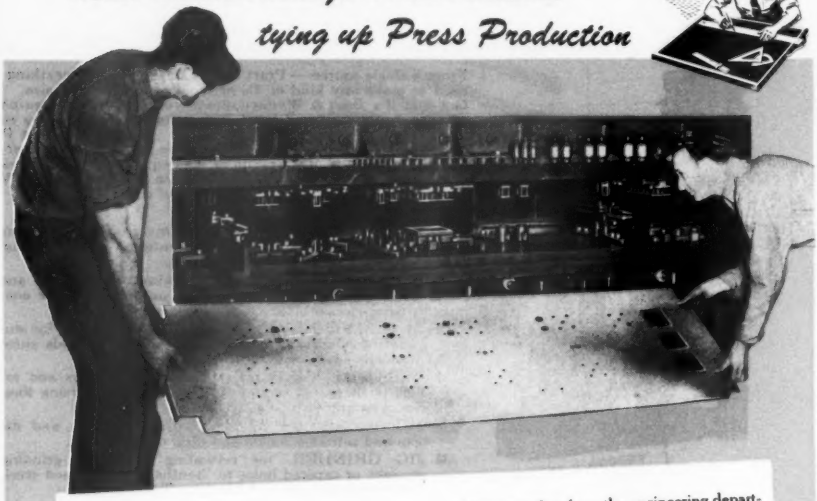
NOT ILLUSTRATED: KELLER CUTTER AND RADIUS GRINDER: sharpens die-sinking and Keller cutters, shapes Keller tracer points. VERTICAL DIE GRINDER: prepares new die block surfaces prior to machining, sharpens dull dies, reconditions die block faces before resinking operations. BURS (rotary files); used in Kellerflex and similar machines, for finishing jobs. P&W furnishes hundreds of styles, shapes, sizes in both high-speed steel and carbide, plus grinding and polishing wheels, etc. SMALL TOOLS: including die-sinking cutters, Keller cutters and tracer points, drills, reamers, counterbores, end mills for jig borers. P&W GAGES: entire range of cylindrical gages, thread gages, snap gages, precision gage blocks, and basic measuring equipment.

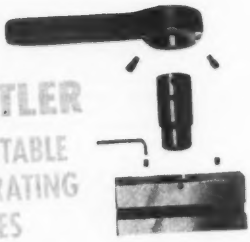
PRATT & WHITNEY
Division Niles-Bement-Pond Co.
WEST HARTFORD 1, CONNECTICUT

PRATT & WHITNEY
Die-and Mold-Making Equipment

"There is no better-paying investment than the right tools for the job"

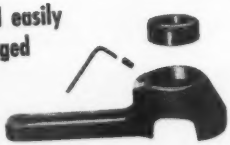
Meet sudden change-orders without tying up Press Production





WHISTLER
ADJUSTABLE
PERFORATING
DIES

quickly and easily rearranged



Change-orders from the engineering department usually cause plenty of headaches in production... particularly where die piercing operations are involved.

But... if you're using Whistler Adjustable Dies, there is no lost time—no waiting—no extra die expense. The same dies are easy to rearrange to the new design. Add units from stock, or delete sizes and shapes no longer required. Arrange the new set-up right on the press.

Consider the savings in production time alone. Then think how continued re-use of the same dies in subsequent jobs writes off first cost.

Whistler Dies can be used in practically any press. All parts are interchangeable. Precision is assured on long or short runs. Closer centers permit fewer press operations.

Deliveries are quick... little or no waiting. Standard round punches and dies up to 3" are available from stock. Ovals, squares, rectangles and special shapes can be made up in a few days. Write for the Whistler Catalogs today and get all the facts.

S. B. WHISTLER & SONS, INC.
748 MILITARY ROAD BUFFALO 17, NEW YORK

TIPS ON USING ROTARY FILES AND BURS

NICHOLSON spares no care, expense or detail in making the most efficient Rotaries that file engineering and manufacturing can produce. Nicholson is equally interested in your getting the most out of them. The suggestions below should help the user toward best results. Your industrial distributor can give you further helpful service — both in selecting the right shapes, cuts, and sizes for your needs and in supplying them at prices that give you unsurpassed values.

1 Move the file or bur at an even rate and pressure to avoid the "hills and dales" which will show up if an unsteady pressure is applied.

2 The speed at which the file or bur can be driven depends to a great extent on its diameter. The smaller it is, the faster the speed. (We will be glad to meet your request for charts of approximate speeds of high-speed steel Rotary files and Ground Burs and Carbide Ground Burs for general applications.)

3 Be sure to use sharp files or burs. Never overlook the fact that the operator's time is the big cost item, and that he needs well-sharpened tools. (Nicholson provides an excellent sharpening service for burs and a conversion service for making burs from worn Rotary files.)

4 Use a short grip on the shank for accurate control, and a longer grip for reaching out-of-the-way places. Although the standard length shanks will do the majority of jobs, other lengths can be secured for special cases.

5 Normally, medium cut files and burs will give sufficient stock removal and acceptable finish to meet most needs. However, if heavier cutting or stock removal is required, coarse cut should be used; and correspondingly, the fine cut should be selected if a very smooth finish is required.

6 Excessive pressure shortens bur life and does not materially add to stock removal. Use a firm pressure and allow the tool to do the cutting.

NICHOLSON FILE CO. • 95 ACORN STREET, PROVIDENCE 1, RHODE ISLAND

(In Canada, Port Hope, Ont.)

NICHOLSON ROTARY FILES

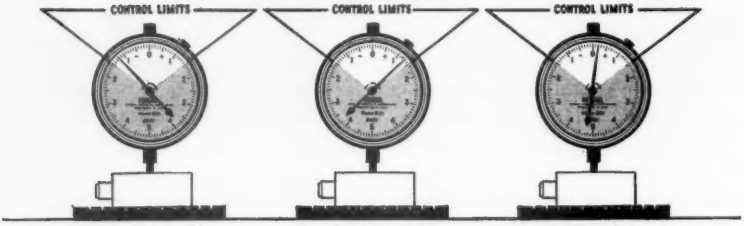
Hand Cut and Machine Ground • High Speed Steel and Carbide

NICHOLSON U.S.A.

SEE ADVERTISERS INDEX, PAGE 83, FOR KEY NUMBERS

Warning!

It's time for new eyes in your production line—
to make the work come through right the first time
—to let your workers see what they're making
—to adjust machines before they produce scrap.



I'm about to produce under-size pieces! | *I'm about to produce over-size pieces!* | *I'm well within my control limits!*

Dial Indicator Gages tell the mechanic what he wants to know. They show him whether the part is too large or too small; they also show him *exactly how much the workpiece is off standard.* He gets an accurate reading *at a glance;* he saves time; he no longer relies on the sense of "feel".

Furthermore, and most important, the Dial Indicator tells the operator exactly how much the work is tending toward the high or low limit. Hence, he knows how much or how far to readjust the setting of the machine.

When control limits are set up on a Dial Indicator, the machine's tendency to exceed these limits is quickly spotted; the machine is adjusted *before the scrap is produced.*

Dial Indicators can be applied to the gaging of any linear dimension. We make both regular and custom-built gages to meet the needs of users in a hundred industries. For highly specialized needs, we also make Air Gages and Automatic Electronic Sorting Gages. Let us help you with any problem of gaging and inspection. If you will send us blueprints of work to be measured, we will gladly recommend the proper gage. No obligation is involved.

FEDERAL

FEDERAL PRODUCTS CORPORATION
1144 Eddy Street, Providence 1, R. I.

YOUR PROFIT DECISION IS *Visible PRECISION**

***The use of Dial Indicator Gages—visible precision—lowers inspection costs, raises production. Federal Products Corporation is America's largest maker of both standard and custom-built gages—mechanical, air, electronic—for the measurement of single and multiple dimensions.**

Represented in Canada by RUDEL MACHINERY COMPANY, LTD.

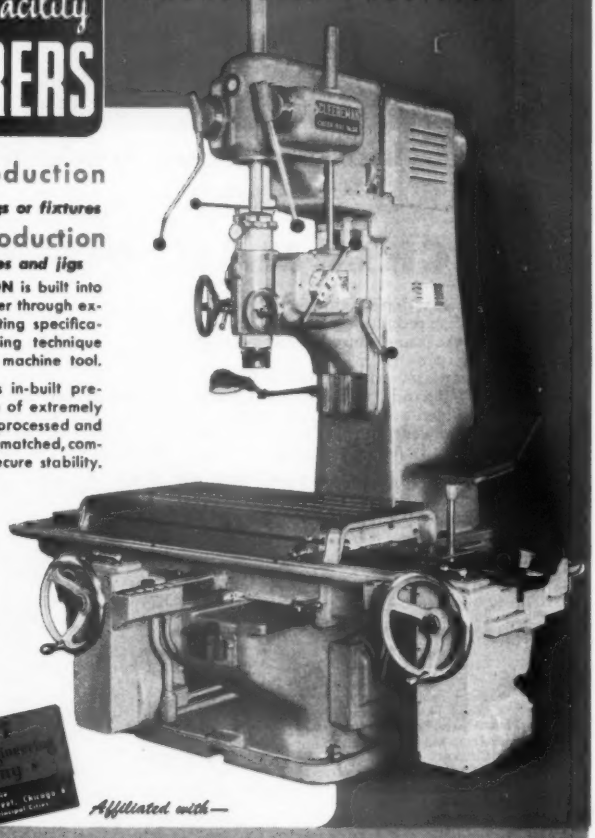
PLEASE USE INFORM-A-GRAM FOR PRODUCT INFORMATION

CLEEREMAN

UNEXCELLED PRECISION

PRECISION with STAMINA and *Operating Facility*

JIG BORERS



Small Lot Production

without layout time, jigs or fixtures

Tool Room Production

of accurate tools, dies and jigs

UNEXCELLED PRECISION is built into every Cleereman Jig Borer through excellence of design, exacting specifications and a manufacturing technique which assures a precise machine tool.

STAMINA maintains this in-built precision through a long life of extremely accurate work. Specially processed and tested materials, properly matched, combat wear of ways and secure stability.

OPERATING FACILITY is widely recognized as characteristic of all Cleereman machine tools. Prepositioning power rapid traverse or electronic traverse and milling control accessories speed operation.

Wire or write for catalog with complete specifications.

1908 1948 40th Anniversary CLEEREMAN MACHINE TOOL CO

Brandt Machinery & Engineering Company

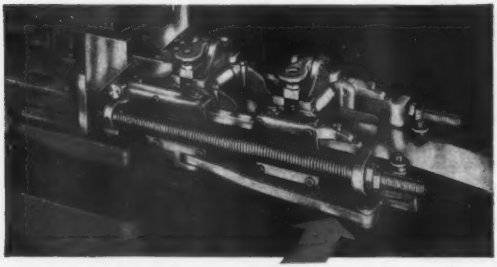
General Office 400 West Mason Street, Chicago 6

Affiliated with—

CLEEREMAN MACHINE TOOL CO. Green Bay, Wis.

BUILDERS OF PRECISION JIG BORERS & DRILLING MACHINES

Still Wasting Time



FEEDING PUNCH PRESSES BY HAND?

Increase Your Production

at least **300%** *with*

DICKERMAN DIE FEEDS

Here is a dependable accurate die feed that reduces operator hours 80 to 90% ... and increases production 300% or more.

Completely automatic, it "takes over" all hand operations. It is speedy and efficient... tough and rugged... with no wearing parts to get out of order. It is flexible enough to feed stock from any angle . . . versatile enough to easily feed *any* punch press. There are advantages to be gained even on short runs of 5000 pieces.

Start saving time and increasing production at once. A Dickerman Die Feed pays for itself in a short while. WRITE for Catalog *now!*

H. E. DICKERMAN MFG. CO.

323-59 ALBANY STREET • SPRINGFIELD, MASS.

DICKERMAN DISTRIBUTORS

W. C. Chapman & Son
Baltimore, Md.
Saratoga 5703

G. W. Brunton & Son
Buffalo, N. Y. (Kenmore)
Riverside 2325

Fidelity Tool & Supply
Camden, N. J., Camden 4-7765
Philadelphia, Pa., Lombard 3-1256

Federal Machinery Sales Co.
Chicago, Ill.
Central 6480

The Die Supply Co.
Cleveland, Ohio
Express 1133

Diemaker Supplies, Inc.
Detroit, Mich.
Trinity 1-2865

The Standard Die Supply, Inc.
Indianapolis, Ind.
Riley 5824

Jamison Steel Corp.
Los Angeles, Cal.
Trinity 9826

The Satterlee Co.
Minneapolis, Minn.
Atlantic 5264

Rudel Machinery Co., Ltd.
Montreal, Canada
Marquette 5346

Acme-Danneman Co., Inc.
New York, N. Y.
Canal 6-1759

Colcord-Wright Machinery & Supply Company
St. Louis, Mo. Central 6970

Lindco, Inc.
Worcester 3, Mass.
4-6764

Jamison Steel Corp.
San Francisco, Cal.
Exbrook 2-2230

J. F. Owens Machinery Co.
Syracuse, N. Y.
Syracuse 5-2632 — 5-2639

Rudel Machinery Co., Ltd. Toronto, Canada Waverly 2488

PLEASE USE INFORM-A-GRAM FOR PRODUCT INFORMATION

...in the New Gorton *RATIOBAR
3-Dimensional Pantograph
for Light Milling and Engraving

This revolutionary machine features the new and exclusive *RATIOBAR Tracer Control—the first basic design improvement in pantograph construction since the first pantograph was built.

Manufacturers of small intricate dies, molds, hobs, stamps and other related products placed firm orders sufficient to take all of the first production run after inspecting the pilot model — real proof of the value built into the P13.

What is *RATIOBAR tracer Control?

*RATIOBAR Tracer Control is the name for the newly developed principal of control, found only on the Gorton P13. It does three important things: permanently aligns the pivot center, cutter spindle and tracing style in an absolute straight line without guessing or innumerable adjustments; enables the operator to set reduction ratios with just one slider block; it provides rigid support for all pantograph linkages. No other manufacturer offers these advantages in a pantograph.

Easier operation and better balance are also assured with the *RATIOBAR because linkages move toward the pivot center as the tracer moves out and away from it. For detailed information, use coupon below.

OTHER MODELS FOR OTHER WORK

The new Gorton P13 is just one of a family of cost-cutting, precision pantographs. Your requirements may call for the 3-L — largest 3-Dimensional Pantograph available today, the 3-U or 3-Z for light or medium milling and engraving in 2 dimensions, or you may require special adaptations or tooling. Our Engineering Service is ready to serve you without obligation.

FREE . . . COMPLETE INFORMATION. Data on the new Gorton P13 as well as other Gorton pantographs. Write for Bulletin 1580 today.

PLEASE SEND WITHOUT OBLIGATION
Bulletin No. 1580 - 1205

Name.....
Company.....
Position.....
Address.....
City.....State.....

SEE ADVERTISERS INDEX, PAGE 83, FOR KEY NUMBERS

32 ALUNDUM

Heavy Feed . . . . Safe, Cool Cut
Less Dressing . . . Long Production Life

The unusual characteristics of this new, single-crystal abrasive make it especially effective for all types of surface grinding — even for grinding large, flat areas of hard, tough alloy steel.

Wheels, cylinders and segments of "32" are smashing many surface grinding records because of their ability to take heavier cuts without burning. The single, complete crystals — produced by an entirely new process and over 99.6% pure useable abrasive — have many sharp cutting points **on all sides.** These sharp nubs — which resist dulling because of their high purity — act as **spearheads** for the main crystals and enable a faster, cooler penetration of the metal, heavier feeds, and faster production.

If you haven't tried 32 ALUNDUM grinding wheels for your surface grinding jobs, get in touch with your Norton abrasive engineer or your Norton distributor today.

W-1160

PLEASE USE INFORM-A-GRAM FOR PRODUCT INFORMATION

Outstanding for

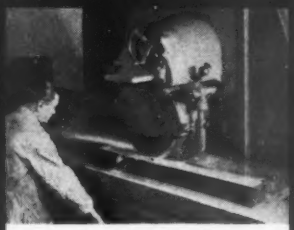
SURFACE GRINDING!

Hardened Alloy Steels

"32" wheels permit a feed **2 to 4 times heavier** than commonly used, because the singularly sharp, nubbly grains provide more cutting points. Suggested specifications: 32A60-F12VBEP or 32A46-H8VBE.

Hardened Steels

The unique, nubbly surface-sharpness of 32 **Alundum** grain insures less frictional drag and promotes a **safer, cooler-cutting action.** Suggested specifications: 32A46-I8VBE or 32A46-J5VBE.



Large Steel Parts

The long-lasting and fast-cutting properties of "32" abrasive enable these wheels **to stay sharp longer,** promoting accurate dimensional control of large flat areas. Suggested specifications: 32A36-J5VBE or 32A36-G12VBEP.

Hardened Die Blocks

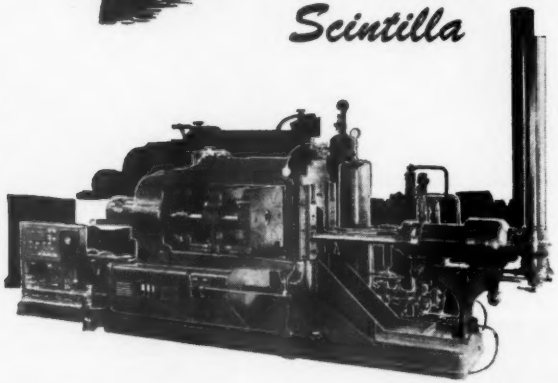
The unique surface-sharpness of "32" crystals, in segments or cylinders, produces a more even grain depth of cut, resulting in the ability to obtain **better finish.** Suggested specifications: 32A36-G8VBE or 32A60-F12VBEP.

NORTON COMPANY WORCESTER 6 MASS.

SEE ADVERTISERS INDEX, PAGE 83, FOR KEY NUMBERS

nd to none...

But one Lester goes beside another at Scintilla



WE at Lester-Phoenix are proud that so many of our customers have more than one of our die casting machines in operation. At the Scintilla Magneto Division, Bendix Aviation Corporation in Sidney, New York, the first Lester-Phoenix die casting machine proved so successful in performance, that a second one was soon placed in operation beside it. That is one of the concrete reasons for making the claim: Lester-Phoenix die casting machines are *second to none.* Complete data on aluminum-magnesium-brass models or zinc-lead-tin models will be furnished on request.

LESTER-PHOENIX, INC.

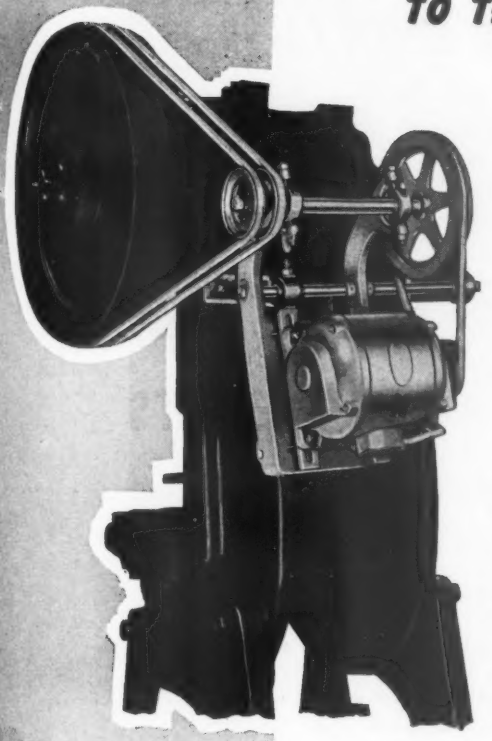
2625 CHURCH AVENUE • CLEVELAND 13, OHIO

LESTER-PHOENIX
DIE CASTING MACHINES

PLEASE USE INFORM-A-GRAM FOR PRODUCT INFORMATION

Modern Motor Drives

DELIVER MORE HORSEPOWER TO THE JOB



---- smoothly

----- silently

---- efficiently

-economically

Broken or worn out gears no longer disrupt your high production schedule when Modern "V" Belt Drives are employed. These "V" Belt Drives deliver FULL horsepower from the driver to the driven sheaves with a positive grip which becomes tighter with the load weight.

Modern Motor Drives utilize standard 1750 rpm motors. Drive shafts are equipped with "Triple Seal" ball bearings — eliminating the need for lubrication.

Modern Motor Drives are manufactured in a variety of sizes and can be adapted for use on practically all machine tool makes and models.

We invite your communications. Immediate deliveries.

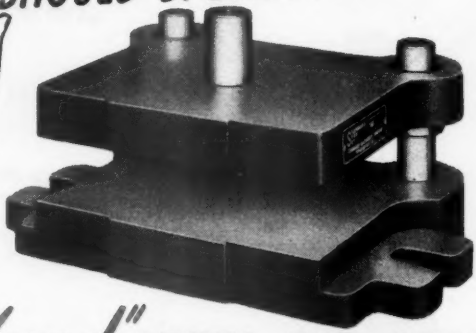
MODERN MOTOR DRIVES

Division of

The Nichols Engineering Company

2400 W. Madison Street Chicago 12 Illinois

GOOD REASONS WHY YOU SHOULD SPECIFY...



"Standard" STEEL DIE SETS

1 **ACCURATE**
Manufactured to extremely close limits.

2 **PRODUCTIVE**
All parts steel . . . instantly interchangeable.

3 **LONG LIVED**
Guide pin bushings lined with Indium Bronze.

4 **SIZED FOR THE JOB**
Complete range of sizes from stock: special sizes to order.

5 **AVAILABLE**
Immediate delivery of cataloged set sizes.

Write for Catalog DS.

Sketch pads available for use in ordering special die sets. Ask for a supply.

STANDARD MACHINERY COMPANY

1531 ELMWOOD AVE., PROVIDENCE 7, RHODE ISLAND

Branch Warehouses:

CLEVELAND
The Die Supply Co.
5349 St. Clair Ave.
UTah 1-0550

DETROIT
Diemaker Supplies Co.
2679 E. Grand Blvd.
TRinity 1-2865

INDIANAPOLIS
Standard Die Supply, Inc.
26 E. McCarty St.
Riley 5824

NEW YORK
Acme-Danneman
203 Lafayette St.
CAnal 6-1760

PHILADELPHIA
Fidelity Tool Supply
309 Vine St.
CAmden 4-7765

WORCESTER
Lindco, Incorporated
1023 Southbridge St.
WOrcester 6-4637

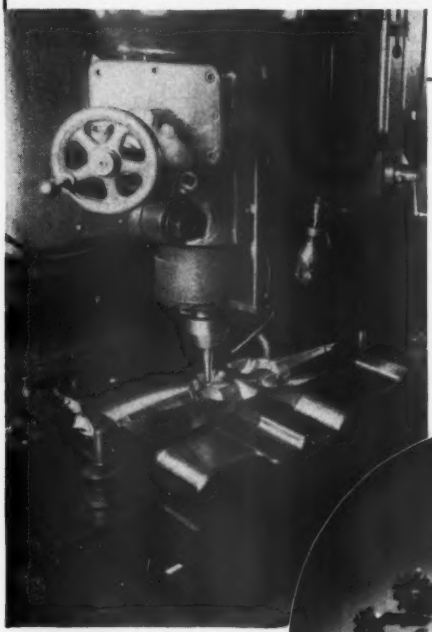
PLEASE USE INFORM-A-GRAM FOR PRODUCT INFORMATION

THE New
INGERSOLL
Cutter Grinder
• The Ingersoll Grinder sharpens in a single setting of the cutter the face, periphery and corners of cutters from 4" to 30" in diameter. It will also grind solid shank, radius, staggered tooth, and angular inserted blade cutters.
WITH NEW IMPROVED ROLLER BEARING HEAD SLIDE WAYS
Eliminating frequent adjustment — Reducing maintenance costs.
NEW REPLACEMENT HEAD AVAILABLE FOR OLD GRINDERS
Mounts in standard yoke.
Write for quotation on new head.
• For more details, write for Bulletin 57H describing its wide range of application.
INGERSOLL

SEE ADVERTISERS INDEX, PAGE 83, FOR KEY NUMBERS

Raise the Feed!

CUT COSTS WITH T-J CUTTERS



Do your cutting in tough die steels *faster* . . . with less breakage . . . and *more work between grinds!* Use T-J Die Sinking Milling Cutters! They're designed for accuracy and sturdiness . . . made from a standard, extremely high grade steel . . . properly machined . . . scientifically heat-treated and accurately ground. Many styles and sizes . . . proved on countless tough jobs! Send for new catalog. The Tomkins-Johnson Co., Jackson, Mich.

A T-J Cutter at work on a drop hammer die block for steering knuckles. The material is molybdenum die steel of C45-C50 Rockwell.

FOR TOUGH JOBS SPECIFY T-J

TOMKINS-JOHNSON

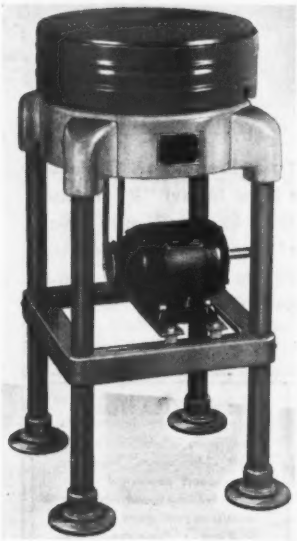
DIE SINKING MILLING CUTTERS

PLEASE USE INFORM-A-GRAM FOR PRODUCT INFORMATION

MIRROR-FINISH HIGH SPEED

LAPPING

with *Spitfire* Precision Lapping Machines



A low cost method of obtaining the finest and most accurate micro-inch surface finishes on such parts as bearings, shafts, hydraulic and pneumatic equipment, valves, sliding or rotating surfaces, seals and parts of precision equipment, tools and gauges. An ordinarily expensive, laborious operation has been turned into an easy and economical production process with the SPITFIRE LAPPING MACHINES.

No set-ups, collets, centers or holders are ordinarily needed, yet these machines can be readily adapted by means of simple, low cost fixtures to the automatic and fine surface finishing of high runs of parts at very low production cost. This enables the manufacturer to obtain that fine finish necessary for close fit, smooth, vibrationless and wear-proof performance. The result is better product performance—satisfied customers—a quality product reputation invaluable in the competitive sales period ahead.

The SPITFIRE PRECISION FLAT LAPPING MACHINE

Produces the finest micro-inch surface finishes, flatness and accurate size on flat surfaces of metals or other materials. Operator merely holds piece in hands and manipulates it on rotating lapping plate. The heavy work of lapping is done by the machine. Amount of stock removal and fineness of finish can be varied by selection of proper abrasive.

Manufactured by:
SPITFIRE TOOLS, INC.

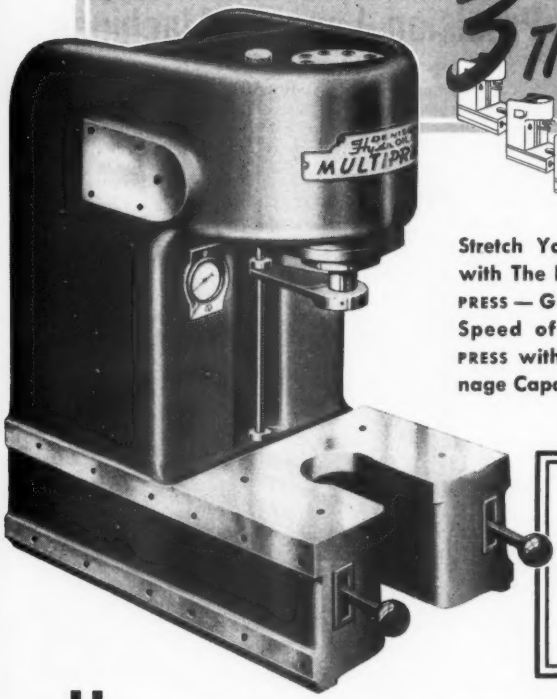
Nationally Distributed by:
UNITED TOOL SERVICE CORP.
3450 W. Harrison Street
Chicago 24, Illinois

The SPITFIRE ROLLER LAPPING MACHINE

Has replaced "ring" and other old-fashioned methods of lapping external cylindrical surfaces in many of the country's finest and largest tool-rooms and manufacturing plants.

It finishes any size cylindrical pieces up to 6" Dia. to plug gauge accuracy and micro-inch finish. This centerless lapping machine tends to remove "waves" or "high spots" along the length of the pieces. Parts can be removed and examined or measured while the machine is running.

The New MODEL "R" MULTIPRESS* is 3 TIMES FASTER



Stretch Your Production Dollars with The New Model "R" MULTIPRESS — Get Three Times the Speed of The Standard MULTIPRESS with No Decrease in Tonnage Capacity.

*T. M. REG. U. S. PAT. OFF.

SPECIFICATIONS

Ram stroke, 6" maximum • Daylight, 12" maximum • Maximum ram speed downward, 1250 ipm • Pressing speed, 500 ipm • Maximum ram speed upward, 800 ipm • Pump capacity, 9 gpm • Electric motor, 5 hp.

Here are all the advantages of oil-smooth HydrOILic power plus production speeds comparable to any type press. If you've felt hydraulic presses were not suited to your high speed operations, you'll change your thinking when you check the new Model "R" MULTIPRESS.

Available in either automatic or manually controlled models, the new high-speed Model "R" gives you reduced die wear; reduction of scrap loss by precise pressure control—regardless of part size variation; efficient operation by unskilled operators; reduced operator fatigue; low operation and maintenance costs and maximum safety of operation. Write for details.

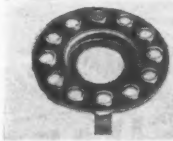
THE **DENISON** ENGINEERING CO.
1197 Dublin Road Columbus 16, Ohio

DENISON EQUIPMENT — APPLIED HydrOILics

PLEASE USE INFORM-A-GRAM FOR PRODUCT INFORMATION

•7200 stainless steel stampings per hour—

•tolerances held within 0.002"——

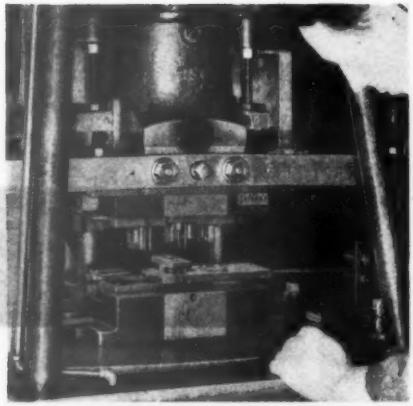


...using

DANLY

STANDARD PRECISION

DIE SET



Sustained operating precision of die set reduces die wear...produces 200,000 stampings per grind

Inherent accuracy in Danly Die Sets permits taking full advantage of the die maker's precision under actual press operating conditions. As a result, close tolerances may be held and tool life is substantially increased.

In the stamping operation shown, stainless steel parts for electrical instruments are pierced, formed and blanked in an intricate progressive die. Tolerances are extremely close, and finished parts must pass rigid gage inspection.

Stampings are produced at a rate of 120 per minute. At this high speed, a tolerance of 0.002 in. is held on inside and outside diameters and the distance between the bent arms. Danly Die Set accuracy is a major factor in maintaining punch-and-die relation, resulting in production of 200,000 parts between grinds.

DANLY ENGINEERING SERVICE—Use Danly Die Sets to insure the same close precision, high production and long die life on all of your press work. Consult our Engineering Dept. for helpful recommendations on die sets—large or small, standard or special—for *any type* of press operation. (No obligation.)

DANLY NATION-WIDE ★ASSEMBLY SERVICE

Danly offices in 10 key cities give immediate attention to your orders. Assembly plants (marked with stars) stock interchangeable parts for quick delivery of any standard die set to your specifications.

★ **Chicago 50,** 2100 S. 52nd Ave.
★ **Cleveland 14,** 1550 E. 33rd St.
★ **Dayton 2,** 990 E. Monument Ave.
★ **Detroit 16,** 1549 Temple Ave.
★ **Grand Rapids,** 113 Michigan Ave., N. W.
★ **Long Island City 1,** 47-28 37th St.
★ **Los Angeles 54,** Ducommun Metals & Supply Co., 4890 S. Alameda
● **Milwaukee 2,** 111 E. Wisconsin Ave.
● **Philadelphia 44,** 18 W. Chelten Ave.
★ **Rochester 4,** 16 Commercial St.

get this *free* bulletin

Write for this informative bulletin, indicating the nature of your requirements.

DANLY **DANLY MACHINE SPECIALTIES, INC.**

2100 SOUTH 52ND AVENUE CHICAGO 50, ILLINOIS

SEE ADVERTISERS INDEX, PAGE 83, FOR KEY NUMBERS

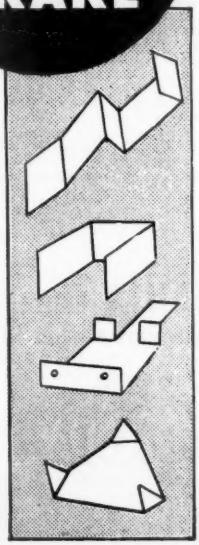
from FLAT SURFACES TO INTRICATE SHAPES

with the New

DI-ACRO BRAKE

- **ROK-LOK—new sensitive material clamp increases accuracy**
- **DOUBLE-EDGED FORMING BLADE allows close reverse bends**
- **NEW PRECISION STOPS accurately control angularity of bends**

This versatile metal forming machine was developed for use in model shops, experimental laboratories and production departments where it often replaces dies for all types of precision forming operations. Di-Acro Brakes will form a great variety of materials including copper, bronze, stainless steel, aluminum and bi-metals.



WRITE FOR CATALOG. New edition of 40-page Di-Acro Catalog contains detailed information on all Di-Acro Brakes, Shears, and Benders and illustrates how these precision machines can be used individually or cooperatively for "DIE-LESS DUPLICATING".

◀ Di-ACRO is Pronounced "Die-Ack-Ro"

DI-ACRO PRECISION MACHINES DIE-LESS DUPLICATING

O'NEIL-IRWIN MFG. CO.

315 8TH AVE., LAKE CITY, MINNESOTA

PLEASE USE INFORM-A-GRAM FOR PRODUCT INFORMATION

ITEMIZED CERTIFICATE OF INSPECTION

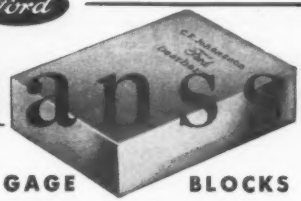
Shows you which blocks, if any, are inaccurate and the extent of inaccuracy. Issued with each inspection.

IT MAY be that long service or careless handling has worn many of your most-used gage blocks until they're 'way out of tolerance. It pays to know which blocks need reconditioning or replacement. Send your whole set of blocks in to Ford for inspection. Cost is only 25 cents a block for "A" and "B" blocks up to one inch, or for each inch of length of longer blocks. (Minimum charge $1.) Details, methods, costs, of reconditioning your gage blocks, including the Ford chrome-plating method, sent on request. Write—

FORD MOTOR COMPANY • JOHANSSON DIVISION
3613 Schaefer Road, Dearborn, Mich.

Ford

Johansson



GAGE BLOCKS

BAKER

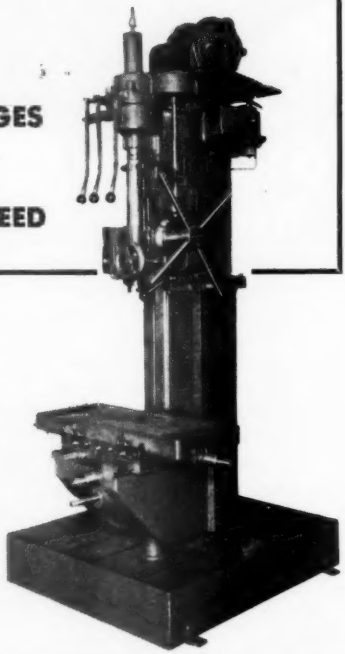
UNIVERSAL QUICK CHANGE DRILL

...with 12

INSTANTANEOUS CHANGES

OF SPEED

AND WITH SELECTIVE FEED



It's *heavy, rigid* and *versatile*... this Baker Drill of the Universal Quick Change type. Assures maximum out of twist drills up to 1½" diameter. Used for heavy duty boring and facing as well as for drilling.

Shown here is Model 150 with standard compound table. Speed and feed changes convenient to operator. Baker-built dependability... engineered to do the job *better* and help *increase productivity.* Write for more details.

BAKER BROTHERS, Inc., Toledo, Ohio

DRILLING, TAPPING, KEYSEATING and CONTOUR GRINDING MACHINES

PLEASE USE INFORM-A-GRAM FOR PRODUCT INFORMATION

Faster than a Slide Rule

George H. Thompson's

"MATERIALS WEIGHT TABLES"

If your job includes calculating the total weight of sheet stock required for a given press run, you cannot afford to be without a copy of the "Thompson's MATERIALS WEIGHT TABLES." These tables are easy to use; requiring only one computation instead of the four usually necessary with a slide rule.

This book includes 32 pages of Weight Tables for sheet steel, plus a four-page supplement on Bar Stock, and a three-page supplement on Drill Rods.

Price $2.00 per copy prepaid.

• • •

The "How-to-Do" of

PRACTICAL QUALITY CONTROL

This collection of TOOL & DIE JOURNAL articles and case histories by top-flight authorities takes the study of Practical Quality Control out of the "arm-chair textbook" category.

The book includes articles by such authorities as Joseph Manuele, Director of Quality Control, Westinghouse Electric Corporation; E. F. Gibian, Chief Industrial Engineer, Thompson Products, Inc.; and A. W. Ehlers, Contributing Editor, Tool & Die Journal.

Price $1.00 per copy prepaid.

•

Hoffman Publications
1975 Lee Road
Cleveland 18, Ohio

Gentlemen:

Please send me the following:

.....copies of Thompson's MATERIALS WEIGHT TABLES at $2.00 per copy.

.....copies of PRACTICAL QUALITY CONTROL at $1.00 per copy.

My remittance, amounting to $....., is enclosed.

NAME.....TITLE.....

ADDRESS.....

CITY.....ZONE....STATE.....

Put the "POCKET-SIZE MACHINE SHOP" to Work!

MOTO-TOOL No. 2 WITH EMERY POINT

$16.50

DREMEL'S improved MOTO-TOOL . . . the little electric grinder that does big jobs . . . can save you hours, by speeding up work now being done by hand. Invaluable for sharpening taps, drills, gauges, chisels, tools and cutters (without tearing down "set-ups"). Dremel Moto-Tool is a "war veteran" . . . used by all branches of the Armed Forces in far-flung repair bases . . . helped to set production records at General Electric, Westinghouse, Remington Arms, Ford, Nash-Kelvinator, Northrup, Douglas and other plants.

Approx. 27,000 R.P.M.

Look for These MOTO-TOOL Features

• Housing has "pencil-type" finger grip • Instant-action, wrenchless chuck • Oil-less, sealed, trouble-proof bearings • Patented automatic chuck lock pin • Oversize armature shaft, hardened, ground and polished • 110 volt, universal type (AC-DC) motor • Easily replaced commutator brushes • About 27,000 R.P.M.; cuts cleaner . . . saves cutters • Sliding snap-type switch • Handy hanger hook • Cord protector • Sturdy, shock-proof bakelite housing • Dust-filtered air-cooling system • Weighs only 13 oz. . . . shaped to fit the hand • Dynamically balanced for vibrationless operation.

MOTO-TOOL KIT No. 2

WITH 23 ACCESSORIES

$23.50

PRE-WAR PRICES STILL PREVAIL

MOTO-TOOL KIT NO. 2, with 23 accessories (high speed steel cutters, grinding wheels, polishing accessories) and heavy-duty professional Model 2 Moto-Tool in natural finish, hardwood case.....$23.50. (Items purchased separately would cost about $30.00; you save $6.50.)
Moto-Tool No. 2, with one emery point $16.50

See your mill supply dealer. If he does not handle Moto-Tool, write the factory.

DREMEL MANUFACTURING CO.
Dept. 528-E Racine, Wis.

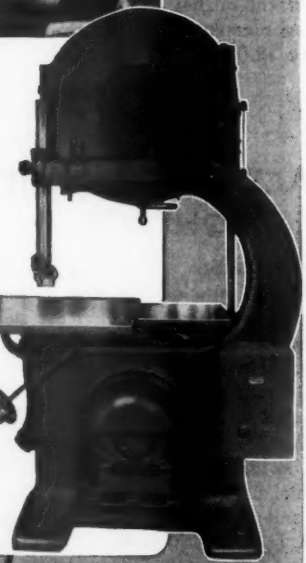
The SUPER METHOD

of TRIMMING FORMED PARTS

and performing a host of other metal cutting jobs!

The negligible down-drag and the ability of Tannewitz High Speed Band Saws to cut sheet metal from 90° to near 0 or 135° at tremendous speed make these machines ideal for trimming. Cuts can be made with perfect safety without using a rest of any kind.

Friction sawing with Tannewitz High Speed Band Saws also results in perfectly amazing time savings in the cutting of flat sheets, soft or hardened steels, armor plate, plastics, glass and many other materials. Whatever your cutting problem, chances are it can be done better and faster with Tannewitz Band Saws. Investigate this "Super" method of cutting.



Write for Your Free Copy

FRICTION SAWING

with **Tannewitz**

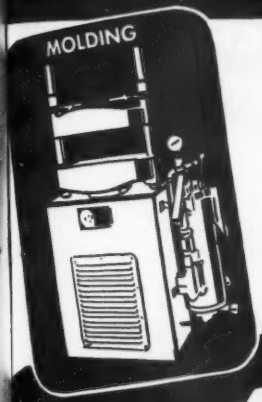
HIGH SPEED BAND SAWS

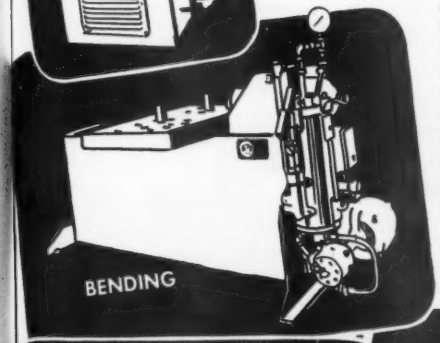
THE TANNEWITZ WORKS GRAND RAPIDS 4, MICHIGAN

PLEASE USE INFORM-A-GRAM FOR PRODUCT INFORMATION

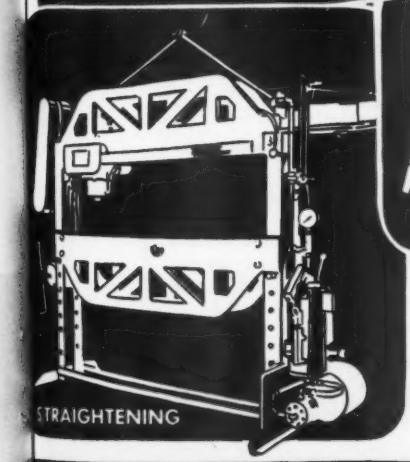
Name the JOB!

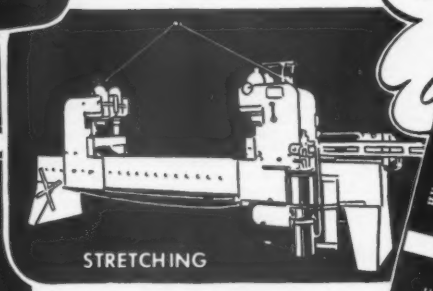
There's a KRW PRESS that can do it BETTER... for LESS





● Illustrated here are four KRW Hydraulic Press adaptations that are typical many being built by KRW today. All are priced from 30 to 200% less than co petitive makes of comparable tonnages or capacities. All are motor-driven a incorporate the time and production proven features that have made the standa KRW Hydraulic Arbor Presses... *the most widely used press of their type America.* Take the KRW Sliding Head Straightening Press an example. This type KRW Press has been effecting tremendo labor savings in fabricating plants where plate must be "tru up" before it is processed or fabricated. The heavy, hand meth formerly used was archaic and very costly by comparison. T same story holds true of KRW Stretcher-Levellers, KRW Bla ing and Forming Presses, KRW Compression Molding Press KRW Bending Presses and many others. To save your time a ours, tell us your problem in terms of what you want to acco plish. We'll give you an answer and furnish literature that pertinent to your needs. Mail the coupon now.





Write for the NEW KRW Catalog.....

K·R·WILSON

215 MAIN ST. · BUFFALO 3, N. Y.

18

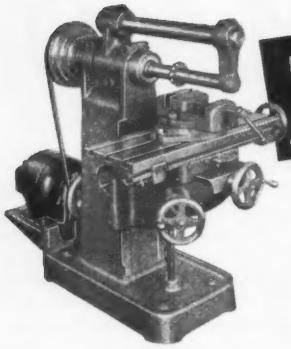
K. R. Wilson, 215 Main Street, Buffalo 3, N. Y.

Please send your catalog. We are particularly interested in your
Bending Presses ☐ Compression Molding Press ☐
Straightening Press ☐ Stretcher-Leveller ☐ Forming and Blanking Press ☐

Firm Name .....

Address .....

City and Zone ..... State .....



BENCHMASTER pays off 5 ways!

Where else can you find a *low cost* tool with so many cost-cutting possibilities?

1 FOR HORIZONTAL MILLING quill and overarm slip quickly and snugly in place. Timken Tapered Roller Bearings provide a rigid spindle support at high speeds as well as low. No. 2 Morse Taper. 12½" horizontal table travel with a big 6" x 18" table area.

2 WANT A VERTICAL MILLER?

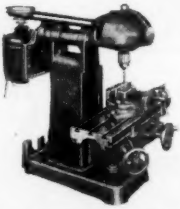
The same machine is quickly converted by substituting this special head. Again Timken Tapered Roller Bearings give smooth, chatter-free performance over a wide speed range. Accessories available: Full line of Benchmaster collets and drawbar; swivel-base vise.

3 WHEN IS A MILL NOT A MILL?

Here's a handy kink to obtain extra *lathe* facilities for facing, turning, forming, etc. Benchmaster Accessories required: Tapered Adapter and Tool Block. By lowering knee position and raising tool you can swing up to 23". Exceptional capacity!

4 QUICK CHANGE ARTIST

Here's the Benchmaster converted to a grinder! Free-rolling bearings maintain high spindle speeds without overheating or risking bearing injury. Grinds internally, surfaces, sharpens cutters, etc. Note Benchmaster 6" Rotary Table—a fine accessory.



5 AND NOW IT'S A DRILL PRESS

The No. 2 Morse Taper in spindle accepts standard Jacobs Chuck Shank. Raising table feeds work into drill. With this setup, drilling layouts is easy—simply measure off correct hole spacing with the lead screws.

★ For Precision
★ For Quality
★ For Value

You can't beat a BENCHMASTER!

NOTE: BENCHMASTERS are also available with rack and pinion feed. For production work this provides exceptionally fast operation.

BENCHMASTERS are accurately built with all the care and precision of larger, more expensive tools . . . yet may be purchased for a fraction of big machine cost! Get our circulars on all BENCHMASTER EQUIPMENT!

Write Dept. TDJ for information

benchmaster MANUFACTURING COMPANY
2932 WEST PICO BOULEVARD
LOS ANGELES 6, CALIFORNIA

benchmaster tools

PLEASE USE INFORM-A-GRAM FOR PRODUCT INFORMATION

Your Choice of 3 Handpieces

No. 2-201: 1/8" and 3/32" capacity chuck; sleeve bearings

No. 2-202: 0 to 1/8" Jacobs Chuck; one sleeve, one ball bearing

No. 2-203: 0 to 1/8" Jacobs Chuck; ball bearings

Low-cost Production Multiple Drill

4 Dumore No. 2 Flexible Shaft Tools are mounted over the work table, their handpieces held in air-actuated feed fixtures. Flexible shaft tools are particularly adapted to this job because their small-diameter handpieces give the close center distances required.

Costs go down

when you boost production with Dumore Flexible Shaft Tools

Dumore No. 2 Flexible Shaft Tool
1/15 HP Universal Motor; 2 output shafts for speed range from 500 - 10,000 rpm; 12-speed foot rheostat control and 3 hand-pieces available.

It's hard to beat Dumore* Flexible Shaft Tools for hand operations on work in hard-to-reach spots. They are maneuverable, powerful, and dependable. But that's only the beginning of their usefulness.

The low-cost multiple drill shown above is a case in point. It solves a "problem" operation — typical of a large group that plagues every plant. These "problem" jobs don't justify heavy investment in special equipment; done a step at a time on basic machines, they bottleneck production — and still add an unnecessary cost burden.

A special set-up with Dumore flexible shaft tools is the perfect solution — it's inexpensive, but it produces in volume at low cost per part. Try the versatile Dumore flexible shaft tools on *your* "problems," and watch them disappear! See your Dumore distributor; or, for complete information, send us the coupon below — *today!*

Sold by leading industrial distributors in all principal cities.

DUMORE
RACINE, WISCONSIN
*Trade Mark Reg. U. S. Pat. Off.

Tear out this coupon and mail today!

The Dumore Co., Dept. E-42, Racine, Wis.
Please send complete information on the Dumore flexible shaft tools.

Name.....
Address.....
City.....(....) State.....

G-14A

SEE ADVERTISERS INDEX, PAGE 83, FOR KEY NUMBERS

Modernize

Your

WASHER

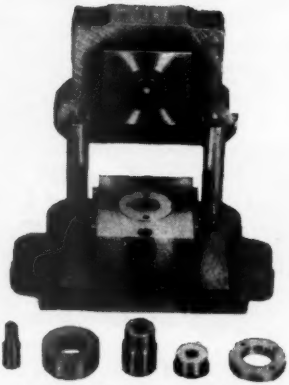
PRODUCTION WITH

HOVIS

UNIVERSAL MASTER

WASHER DIES

Simply Invest in this MASTER WASHER DIE →

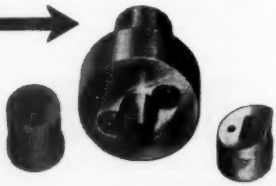


then simply change 5 small interchangeable parts shown below to make a

NEW SIZE WASHER

A great many manufacturers also use the Hovis Master Washer Die as a holder for making various blanks in their own die room, eliminating the cost of new die sets.

Use This SPECIAL HOLDER →



FOR HOLDING INTERCHANGEABLE PUNCHES, COMPOUNDS AND BUTTON DIE, which can be adapted to fit the ram of any press. An inexpensive and valuable accessory. Sizes from ½" to 3". We also specialize in the manufacture of Intricate Punches and Dies.

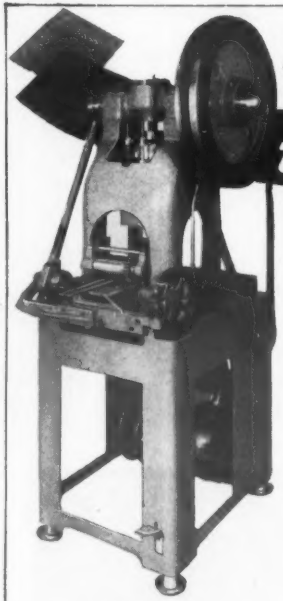
HOVIS SCREWLOCK COMPANY

8100 E. NINE MILE ROAD — **VAN DYKE, MICHIGAN**

Phone: Centerline 1575 — **Suburb of Detroit**

SEE ADVERTISERS INDEX, PAGE 83, FOR KEY NUMBERS

DIEBEL HI-SPEED AUTOMATIC PRESSES



12 TON PRESS
65-300 STROKES
PER MINUTE

DEPENDABLE SERVICE
INCREASED PRODUCTION
EFFICIENT PERFORMANCE
BUILT-IN AUTOMATIC FEED
ECONOMICAL TO OPERATE
LOW INITIAL COST

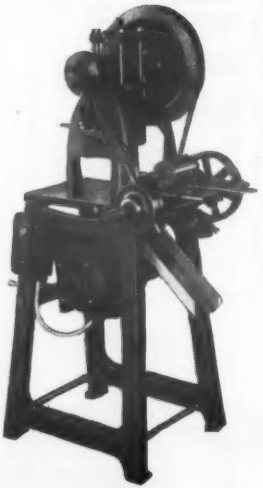
Twelve ton press equipped with single stroke operation clutch.

Presses are available with a double system of feeding with a set of rollers front and rear.

Diebel presses are employed with ferrous and nonferrous metals, fiber, plastics, rubber, and paper.

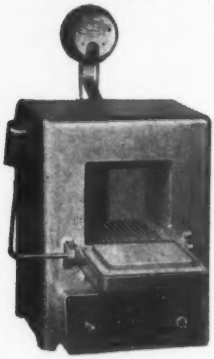
Complete details will be provided promptly on request.

5 TON PRESS
180-550 STROKES
PER MINUTE



DI MACHINE CORP.
2708 IRVING PARK ROAD • CHICAGO 18, ILLINOIS

MODEL GTP



MODEL CEA

MODEL OFE

TEMCO

ELECTRIC FURNACES

With the new TEMCO stepless control you can select and hold any desired temperature.

Model GTP—interior 4" x 3¾" x 3¾". May be operated continuously up to 1500° F. and intermittently to 1850° F. Embedded heating element. Power consumption 1.2 kw. Cast aluminum body. Weight 15 pounds.
For 115V A.C.....**Price $57.50**
Also available for 230V and D.C.

Model CEA—interior 4¾" x 4¼" x 6". Maximum continuous temperature 2000° F. Element is embedded for its protection and surrounds muffle chamber for uniform heating. Power consumption 1.5 kw. maximum. Insulated aluminum body. Weight 31 pounds.
For 115V A.C.....**Price $80.00**
Also available for 230V and D.C.

Model OFE — available in two interior sizes, and two types of built-in controls. "S" models have indicating pyrometer and electrically operated input controller. By adjustment of control knob, any temperature from 350° to 1900°F. can be selected and automatically held. "V" models have fully automatic Veritron Electronic Pyrometer Controller which can be pre-set for temperature to be maintained. Operating temperatures: 1600°F. continuous, 1900°F. intermittent. Dual insulated, ruggedly built.

MODEL	MUFFLE SIZE	WATTS	PRICE
OFE-S-10	6" x 5" x 10"	2400	$194.00
OFE-V-10	6" x 5" x 10"	2400	280.00
OFE-S-19*	6" x 5" x 19"	4500	270.00
OFE-V-19*	6" x 5" x 19"	4500	356.00

*230 V. only — Other models either 115 V. or 230V., 50/60 cy., 1 ph.

Write for full information and name of nearest distributor.

474-5 WEST LOCUST ST., DUBUQUE, IOWA

THERMO ELECTRIC MANUFACTURING COMPANY

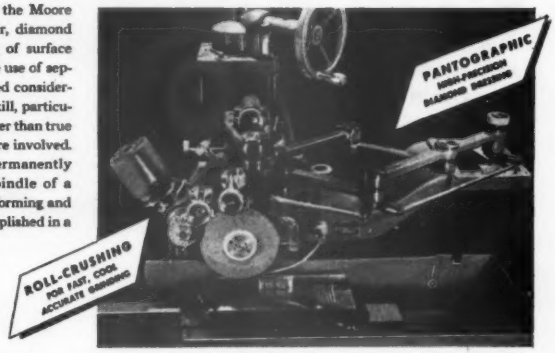
PLEASE USE INFORM-A-GRAM FOR PRODUCT INFORMATION

Now you can combine roll-crushing and diamond dressing in a single wheel dresser to speed form grinding

Before the development of the Moore Panto-Crush Wheel Dresser, diamond dressing and crush-forming of surface grinder wheels called for the use of separate devices. These required considerable set-up and operating skill, particularly where odd contours other than true radii and straight surfaces are involved.

Now with the Moore, permanently mounted on the wheel spindle of a surface grinder, both crush-forming and diamond-dressing are accomplished in a single mechanism.

Here's how this 2-in-1 machine does it:



1. Combines Pantograph, working directly from template, and *Roll-Crushing* in one device, accurately related to spindle.

2. Switches from one method to the other without disturbing workpiece setting or location of either trueing device.

3. No setting up of complex attachments each time wheel is dressed . . . no raising of wheel spindle from work to dress, yet wheel spindle may be raised or lowered without losing relation of wheel form to dressing device . . . crusher method saves diamond costs.

4. Assures highest roll-crushing accuracy and economy. Crusher roll is *ground* and *used* on same spindle, without disturbing position . . . no expensive machine required to grind crusher roll . . . no worry about hardening distortion, because roll is ground *in place* from the solid directly from template.

5. Takes Skill out of job, yet adds advantage of crush dressing for heavy cuts without heating work, and ultra-precision diamond dressing.

6. Device need not be removed to use machine as conventional surface grinder.

Both MACHINE DESIGN and MACHINERY magazines devoted considerable editorial space to technical discussions of the value of this ingenious new mechanism. We'll be glad to send you reprints and a descriptive catalogue on Panto-Crush.

MOORE SPECIAL TOOL CO., Inc.
726 UNION AVENUE, BRIDGEPORT 7, CONN.

HAVE YOU BOUGHT YOUR COPY OF "PRECISION HOLE LOCATION"?

Over 5,000 copies of this valuable book on toolmaking practices have been sold to date. Available at special price of $3 in U. S. A.; $3.50 outside U. S. A. 448 pages, over 400 illustrations. 184 pages of Woodworth Coordinate Location Tables from 3 to 100 holes. Send check or money order to Moore Special Tool Co., Inc., Bridgeport 7, Conn.

Add a MOORE to YOUR TOOLROOM

JIG BORERS · JIG GRINDERS · PANTO-CRUSH WHEEL DRESSERS
DIE FLIPPERS · COMPLETE LINE OF HOLE LOCATION ACCESSORIES

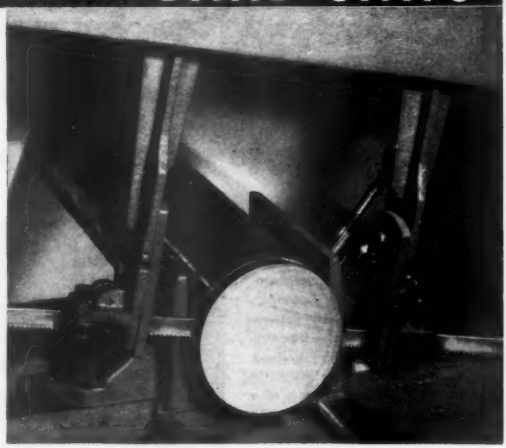
SEE ADVERTISERS INDEX, PAGE 83, FOR KEY NUMBERS

BARNES METAL CUTTING BAND SAWS

LOWER COSTS

OF MISCELLANEOUS AND PRODUCTION SAWING

ON YOUR METAL CUT-OFF BAND SAW



Barnes Band Saw Blades are made of carefully selected steel . . . have perfectly milled teeth and even tooth set . . . are expertly heat treated . . . and produced by specialists with years of saw-making experience. All these factors result in a blade that definitely LOWERS COSTS and pays you extra dividends in more efficient performance.

Prove this statement — specify Barnes Band Saw Blades for your next sawing job! Your distributor can offer many worthwhile sawing suggestions and help you select the Barnes Blades of correct type and tooth specifications best suited for your particular cut-off operations. Call him today!

Call YOUR INDUSTRIAL DISTRIBUTOR for speedy delivery of Barnes Blades and other industrial products

ESTABLISHED 1919

W. O. BARNES CO., INC.

DETROIT 14, MICHIGAN

PLEASE USE INFORM-A-GRAM FOR PRODUCT INFORMATION

YOU DON'T HAVE TO STAND ON YOUR HEAD

. . . to do a difficult job on a

FRAY Miller!

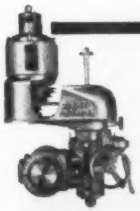
Fray

Precision

RAM TYPE NO. 7-B

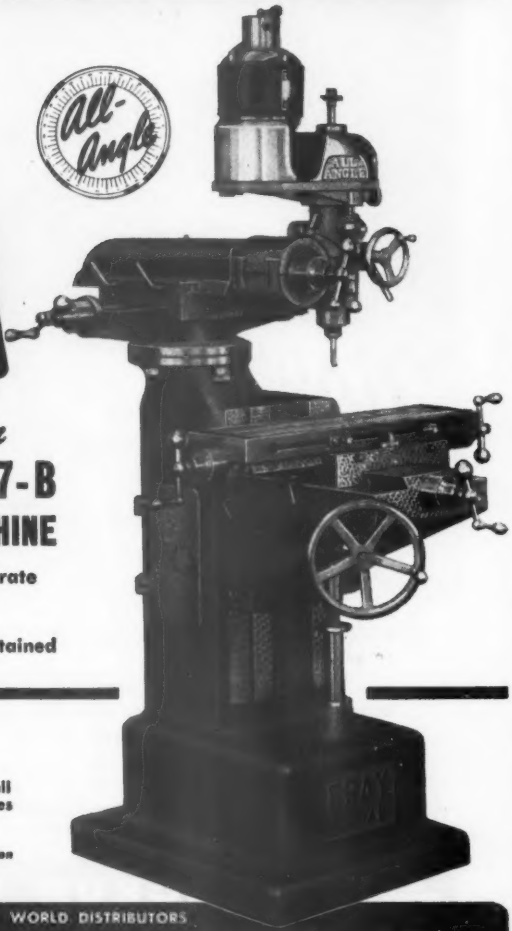
VERTICAL UNIVERSAL MILLING MACHINE

- Flexible
- Sturdy
- Universal
- Easy to Operate
- One set up
- All angles quickly obtained



- Four sizes
- Four types
- Adaptable to all Milling Machines

For further information write Dept. E



WORLD DISTRIBUTORS

H. LEACH MACHINERY CO.

387 CHARLES STREET PROVIDENCE 4, R. I.

AGENTS IN ALL PRINCIPAL CITIES

SEE ADVERTISERS INDEX, PAGE 83, FOR KEY NUMBERS

Now!

A HEAVY DUTY

BORING and THREADING

TOOL HOLDER

with vertical adjustment

Here's a new heavy duty boring tool holder designed to fit all sizes of Bokum Boring Tools up to No. 12. It brings you greater speed and accuracy in setting boring tools to correct height—a real convenience when setting up such critical jobs as taper boring or internal threading.

The holder and 6 split-sleeve adapters form a set in a special box. The holder is bored to take 1½" shanks directly and with sleeves the following shank sizes: ½", ⅝", ¾", ⅞", 1" and 1¼".

Send for catalog

For complete catalog of Bokum Boring Tools, ask for E-1139 for super high speed tools and for E-398 for carbide-tipped tools.

TRADE MARK REG. U. S. PAT. OFF.

BOKUM TOOL CO.

14775 WILDEMERE AVE. · DETROIT 21, MICH.

SINGLE POINT BORING TOOLS—INTERNAL THREADING, BOTTOMING AND FACING TOOLS—CARBIDE TIPPED TOOLS

PLEASE USE INFORM-A-GRAM FOR PRODUCT INFORMATION

FOR A GOOD TURN *FASTER*—TURN TO MONARCH

For repetitive high production, for small lot production, for ultra-precision in the toolroom—you can't beat Monarch.

This, the broadest line of metal turning equipment in the world, includes:

- Engine Lathes—10″ to 32″
- The Uni-Matic
- Toolmaker's Lathes—10″ to 20″
- The Magna-Matic
- The Speedi-Matic
- The Shapemaster
- The Mona-Matic (illustrated above)

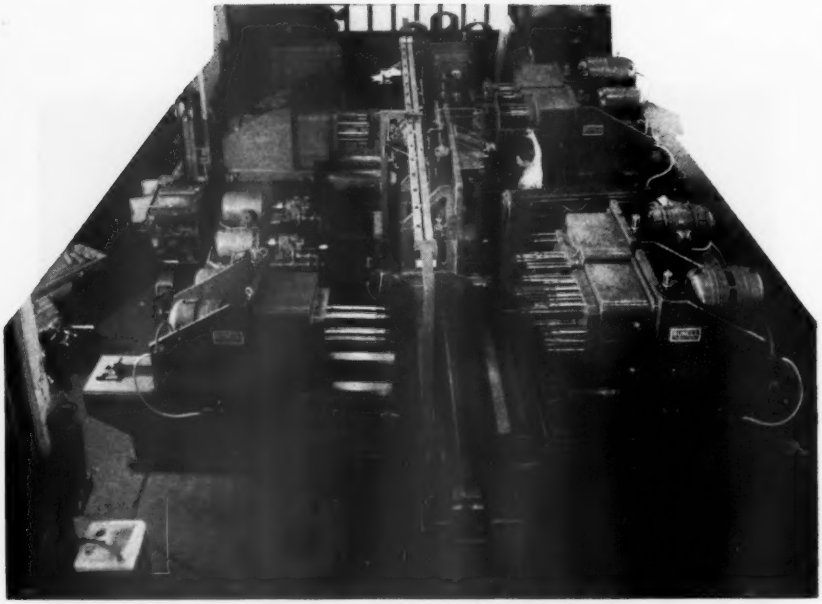
Applicable to many of the basic types are the following exclusive, profit-building, shape duplicating attachments:

- ★ "Air-Gage Tracer"
- ★ Automatic Sizing
- ★ Keller Controls

Monarch TURNING MACHINES

THE MONARCH MACHINE TOOL COMPANY · SIDNEY · OHIO

SEE ADVERTISERS INDEX, PAGE 83, FOR KEY NUMBERS



Bunell Designed and Built

this transfer machine to drill and tap holes in a cast frame

in one eighth of the time it took by the old method.

The action is automatic after the workman *places* the frame into a fixture. Over 150 spindles work on the frame in a travel of 20 feet, first drilling and tapping the holes. In between these two operations, air nozzles blow out the chips. Complete weight of the machine is 62 tons.

This machine is illustrative of Bunell precision manufacture that is available to you . . . experience covering more than a quarter of a century.

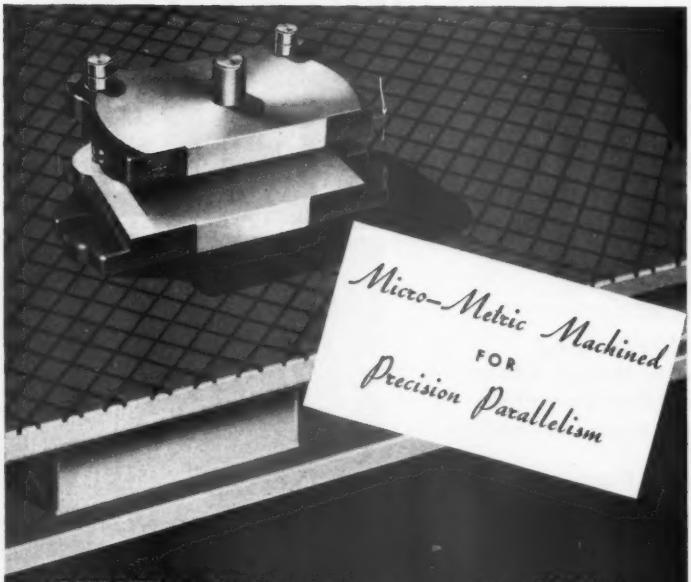
Whatever your industry, check with Bunell when you are in need of special machines, tooling, dies, jigs, fixtures and gauges. Send a print for estimate. Here there is adequate machine capacity . . . skilled engineers and technicians. We are geared to serve you well.

The

BUNELL

MACHINE AND TOOL COMPANY

1601 East 23rd Street • • **CLEVELAND 14, OHIO**



"DETROIT" standard die sets are Micro-metric jig-bored and machined to exceptionally close limits of parallelism, flatness and squareness with the guide-pin axis. This precision reduces strain warping, and results in longer die life and long, uninterrupted production runs. Order from your "DETROIT" representative.

CALL "DETROIT"

DETROIT	TR 2-5150
BUFFALO	PA 9206
DAYTON	HE 3042
INDIANAPOLIS	HU 5604
LOS ANGELES	AD 7251
MILWAUKEE	ED 2359
MINNEAPOLIS	AT 5264
PHILADELPHIA	VI 4-4084
PITTSBURGH	GR 1362
PORTLAND, ORE.	AT 3697
ROCK ISLAND, ILL.	RI 743
ST. LOUIS	FR 6811
SAN FRANCISCO	EX 2-7018
SEATTLE	LA 7100
TOLEDO	GA 5706

DETROIT DIE SET CORPORATION

2895 W. GRAND BLVD. • DETROIT 2, MICHIGAN

DETROIT DIE SETS ★

SEE ADVERTISERS INDEX, PAGE 83. FOR KEY NUMBERS

cut production costs with a SHOPLIFTER

- **Light, Compact**
- **Easily Moved About**
- **One-Man Operated**
- **Wide Range in Application**
- **Saves Production Time**
  In handling dies and heavy fixtures; stacking barrels, boxes, etc.; loading and unloading trucks

Specifications

Type—D
Capacity—500 lbs.
Overall height—72"
Platform lift—54" above floor level, lowers to within 5" of floor
Baseframe—24" wide x 33" long
Platform—24" x 24", steel plate
Entire frame of machine of structural steel, electrically arc welded throughout
Basewheels—4" diameter, iron wheels
Crank up and down hoist unit
Two swivel casters and two stationary wheels with push bar furnished
Painted olive green finish
Weight—250 lbs. (approx.)

Heavier capacities up to 5,000 lbs. also available. Write for details.

Prompt Delivery . . . Price $157.50. Full freight allowed

Foot Operated Floor Lock—$10.00 extra

2659 WEST VAN BUREN STREET, CHICAGO 12, ILLINOIS

ECONOMY ENGINEERING CO.

60 Pounds of Swarf IN 8 HOURS

REMOVED BY

BARNESDRIL

AUTOMATIC COOLANT SEPARATOR ON GRINDING OPERATIONS . . .

Example: Landis Thread Grinder

Machine shut downs for clean out and maintenance are costly and hinder productive output on certain types of operations such as honing, grinding, shaving, and shaping. The accumulation of fine sediment and swarf rapidly plugs coolant lines, seriously effects work finish, and destroys coolant life. Machines on these operations must be shut down frequently to keep them clean and operating efficiently.

BARNESDRIL Automatic Coolant Separators, installed on a battery of Landis Thread Grinders, have eliminated this maintenance problem and increased operating efficiency as much as 90%. A No. 4 Separator is installed on each machine and removes an average of 60 pounds of swarf from each machine every 8 hours. As a result, a constant supply of clean coolant is assured and both direct maintenance costs and valuable production time have been saved.

Capacity of this No. 4 Separator supplies 40 gallons of clean coolant per minute. Other models range from 5 to 100 gallons per minute. Check your requirements for maintenance and sludge removal. A **BARNESDRIL** Automatic Coolant Separator will improve machine performance and efficiency.

Write for Bulletin B 151 F.

BARNES DRILL CO.

862 CHESTNUT STREET ROCKFORD ILLINOIS U S A

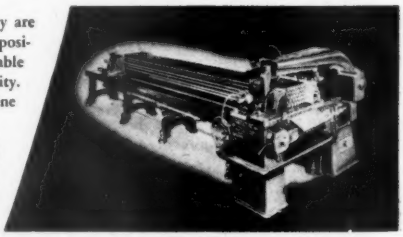
SEE ADVERTISERS INDEX, PAGE 83, FOR KEY NUMBERS

RACINE machines get out the work

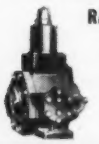
Out on Chicago's west side, the Kropp Forge Company puts RACINE Heavy Duty Hydraulic Metal Saws to a real performance test. In this modern forge shop, billets and blooms are cut to proper lengths for forgings. Finished forgings are sawed to specified dimensions in a wide range of sizes and steel grades. Huge die blocks are also cut to working size as shown to the right. RACINE Automatics are used for high speed multiple cutting work.

CUTTING 20" DIE BLOCK

RACINE's line of metal cutting saws is complete. They are hydraulically operated to assure smooth, oil-cushioned, positive and efficient cutting of any metal. Models are available in a wide range of sizes from 6" x 6" to 20" x 20" capacity. Write for Catalog No. 12. Address Racine Tool & Machine Co., 1778 State Street, Racine, Wisconsin.



RACINE AUTOMATIC



RACINE Hydraulic PUMPS and VALVES

Investigate RACINE's Variable Volume Oil Hydraulic Pumps. Capacities to 30 G.P.M. Pressures to 1000 p.s.i. Oil Hydraulic sleeve-type, balanced-piston valves in ⅜" to 1½" I.P.S. Ask for Catalog P-10-C.

RACINE — STANDARD FOR QUALITY AND PRECISION

PLEASE USE INFORM-A-GRAM FOR PRODUCT INFORMATION

SEND FOR THIS Hammond's CARBIDE TOOL GRINDER CATALOG

THIS 8½" x 11" CATALOG contains "Helpful Suggestions" on the handling and grinding of Carbide Tools and shows our complete line of Chip Breaker and Carbide Tool Grinders. Mail coupon today. Catalog No. 220 will be sent promptly.

HAMMOND MACHINERY BUILDERS, Inc.
1631 DOUGLAS AVENUE, KALAMAZOO, MICHIGAN

YES we are interested. Please send us a free copy of Carbide Tool Grinder Catalog No. 220.

Company Name_____ Title_____

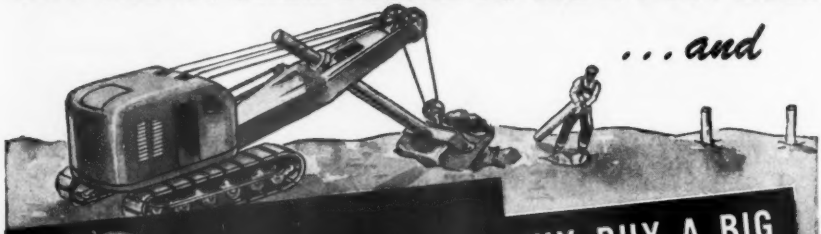
Individual_____

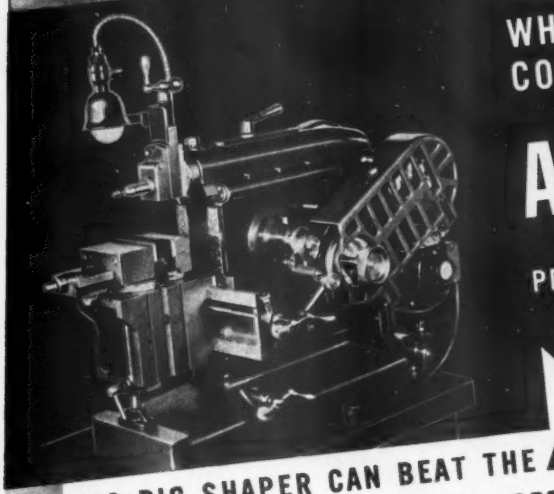
Address_____ Zone____ State_____

City_____

WHY USE A POWER SHOVEL TO DIG A POST HOLE

. . . and





WHY BUY A BIG COSTLY SHAPER WHEN THE AMMCO WILL GIVE TOP PERFORMANCE UP TO 7"?

NO BIG SHAPER CAN BEAT THE AMMCO FOR *ACCURACY* ☆ *VERSATILITY* ☆ *SPEED* ☆ *ECONOMY*

The finest precision work with the very minimum of set-up time and results that will amaze you—that's what users of the AMMCO 7" Shaper report the world over. The AMMCO is not a "light weight" shaper, it's tough enough for the heaviest production schedule and perfect for all-around tool and die or shaping operations—it's the "precision machine of a thousand uses." It is available in bench or portable cabinet models. Write for a copy of our complete, illustrated catalog No. TD548.

You can do it Better and Faster with AMMCO *Skill is Built into Every Ammco Product*

AMMCO TOOLS, INC. · COMMONWEALTH AVE. · NORTH CHICAGO, ILL.

keep your scrap moving

A strenuous appeal is being made by the American Iron and Steel Institute's Committee on Iron and Steel Scrap, pointing out to steel users and fabricators the current woeful lack of an adequate supply of ferrous scrap and the resultant necessity of getting more scrap on the move back to steel mills and foundries.

Scrap normally constitutes fifty percent of the charge in open hearth furnaces from which by far comes the greatest proportion of all steel. Steel mills and foundries seeking to fill these needs have had added problems because of the poor quality and short supply of scrap which they are compelled to use.

Here is a challenge to all steel users: *to get more steel there must be more scrap collected and started off to the mills.*

The national reservoir of scrap was drained during the war years and has not been refilled. Paradoxically, the pent-up demand for consumer goods mitigates against the collection of scrap from many normal sources, because just so long as people wait for the new, they hang on to the old; hence that much less scrap.

The spring months are traditionally "clean-up" times in factories as well as on farms. If the current urgent need for scrap can be fully realized by all plant managements, by the owners and operators of every tool and die shop, contract manufacturer, machine shop and foundry, large or small, in the country, the production bottlenecks in many of these same plants can be relieved. Orders that have piled up for many months will begin to flow more rapidly to the waiting buyers.

Right here and now, the metalworking industry can help itself most by collecting the scrap and getting it into production.

E. Willard Pennington

editor

Statistical Quality Control for the Shop Man*

by C. W. Kennedy
Quality Control Engineer
Federal Products Corporation
Providence, R. I.

If the following application of one statistical quality control method is consistently followed at a machine, the scrap and rework for that machine can be reduced to a figure lower than 1% and kept there. At the same time, almost invariably, the operator's production will increase about 10% with less effort on his part. No speedup is implied; it is simply that greater efficiency is naturally gained.

Furthermore, when the systematic technique about to be described is spread over a department or an area, the local inspector is soon covering about twice as many machines as formerly.

The first step is the selection of a dimension to which a part or product is being machined, an important dimension —"critical", if you please—or one which has been difficult to maintain. As an example, consider form-tool-turning a shoulder on a motor end shield. The essential dimensions are shown in the drawing, Figure 1.

Dimension A, Figure 1, was the least important, with a tolerance of $\pm\frac{1}{64}$". The operator checked this occasionally, after setup, with a snap gage. For the shoulder, B, Figure 1, the blueprint showed tolerances of ±.005". Control of this depth was assisted by an indicator bearing against the tool carriage in the manner shown in Figure 2.

But holding the bore, dimension C of Figure 1, to −.000", +.002" had been the subject of much investigation, opinion, argument and shrugging of shoulders. Finally, one of the statistical and charting techniques of quality control was tried.

The next step embraced designing and securing gaging equipment whereby the bore, dimension C of Figure 1, could be accurately measured. Quality control charting and statistical techniques necessitate systems of measurements capable of reading one-tenth of a tolerance spread. In the case of the motor end shield bore, with its tolerance spread of .002", the gage must be read as fine as, and be sensitive to, .0002".

With normal production proceeding at a little better than a piece per minute, arrangements were made to visit the machine every half hour. Five pieces, one

**A digest of a lecture by Mr. Kennedy before the New York City Section, American Society for Quality Control, November 21, 1947.*

after the other as they were machined, were then taken from the machine and allowed to cool. The bore of each piece was measured. Then the five readings were recorded in the first column of a work sheet, a section of which is illustrated in Figure 3. Next, a minute of arithmetic. The average of the five readings was secured by adding them and dividing by five, as shown in Figure 3.

There will be a variation in size among any successive five pieces taken from an operation as suggested above. (If there isn't, suspect the measuring method!) Hence, the highest or largest measurement or observation in the group can be selected as well as the lowest or smallest.

In column No. 1 of the Work Sheet, Figure 3, this largest reading of the group has been recorded and, beneath it, the smallest. The one subtracted from the other gave a result called, in statistical quality control parlance, the Range.

Half an hour later, five pieces again from the machine. The bores were measured and recorded in the second were taken as they fell in succession column of the Work Sheet, Figure 3. These readings are reproduced directly below and the details of calculating the Average and the Range of the sample are shown:

Readings:	3.9705"	
	3.9695	
	3.9718	
	3.9705	
	3.9707	(add)
Sum:	19.8530	
(divide,	19.8530/5)	
Average:	3.9706"	
Largest reading:	3.9718	
Smallest reading:	3.9695	(subtract)
Range:	.0023"	

This process of machine observations was continued at each half hour throughout the day until fifteen samples, fifteen sets of readings and calculations had been obtained. Consequently, a series of fifteen Ranges had been made available. For reference, these fifteen Ranges are listed below:

.0013"	.0014"	.0015"
.0023	.0005	.0010
.0003	.0010	.0012
.0017	.0020	.0010

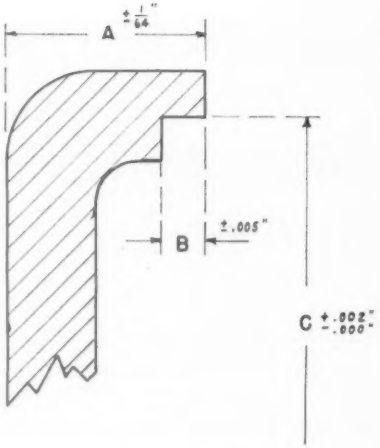


Fig. 1. Of the three dimensions indicated, dimension "C" lends itself to statistical quality control methods.

.0008	.0012	.0010

The average of these fifteen Ranges is needed, as will be seen below. Hence they are added, and their sum, .0182", is divided by 15, giving an average Range for the day's work of .0012" (.0182 ÷ 15).

Fig. 2. Dimension "A" of Figure 1 is checked occasionally with a snap gage. Dimension "B" is kept within limits by an indicator reading against the tool carriage as shown above.

WORK SHEET

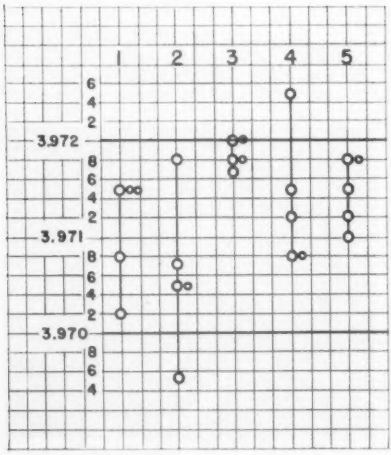
SAMPLE OR SUB-GROUP NUMBER					1	2	3	4	5
DIMENSION AND TOLERANCES.					3.9715	3.9705	717	725	718
3.970 +.002 −.000	SAMPLE MEASURINGS OR MEASUREMENTS			X	3.9715	9695	720	708	712
					3.9715	9718	720	708	715
					3.9708	9705	718	712	718
					3.9702	9707	718	715	710
SUM OF SAMPLE READINGS					19.8551	19.8730	5793	5768	5738
AVERAGE of each Sample $\bar{X}$ (Plot on Chart)					3.9711	3.9746	3.9719	3.9714	3.9715
				LARGEST VALUE	3.9715	718	720	725	718
				SMALLEST VALUE	3.9702	695	717	708	710
RANGE of each Sample R (Plot on Chart)					.0013	.0023	.0003	.0017	.0008
6	7	8	9	10	11	12	13	14	15
715	722	715	702	715	710	715	690	710	718
713	720	713	710	713	700	710	695	703	715
720	720	705	715	720	708	713	688	710	708
715	718	710	708	718	702	710	683	713	715
706	713	708	695	725	695	705	690	706	708
569	603	551	530	571	505	553	446	542	574
3.9714	3.9721	3.9710	3.9706	3.9718	3.9703	3.9711	3.9689	3.9708	3.9715
720	723	715	715	725	710	715	695	713	718
706	718	705	695	713	695	705	683	703	708
.0014	.0005	.001	.002	.0012	.0025	.001	.0012	.001	.001

Fig. 3. The work sheet on which is recorded dimension "C" from samples of five successive pieces every half hour.

The average Range, abbreviated to the symbol $\bar{R}$ (barred R), is the essential figure toward which most all the day's work is directed.

Next, a formula is used:

Fig. 4. The "dot" chart that is used to reproduce, graphically, the detailed information of the work sheet, Figure 3.



$$\text{Tolerance Spread} => \frac{6\bar{R}}{d_2}$$

The tolerance spread must be equal to or greater than $\frac{6 \times \bar{R}}{d_2}$. In other words, the expression $6\bar{R}/d_2$ should never exceed the tolerance spread. If an average Range, $\bar{R}$, secured from a series of samples and multiplied by $6/d_2$, does exceed the tolerance spread, the operation in question is not only likely to, but is practically bound to produce undersized or oversized pieces, i.e., scrap or rework.

The so-called dispersion factor, d_2, is 2.326 for a sample size of 5. It is a mathematical constant furnished by the statistician.

The formula above could be written:

$$\text{Tolerance Spread} => \frac{6}{d_2} \times \bar{R}$$

$$=> \frac{6}{2.326} \times \bar{R}$$

$$=> 2.58\bar{R}$$

When an average Range, $\bar{R}$, for an operation is known, this $\bar{R}$ can be multiplied by 2.58 and the result compared with the tolerance spread.

In the case of the motor end shield bore, the average Range, $\bar{R}$, secured from taking the readings of 15 trials or samples of 5, turned out to be .0012", as per the tabulation and calculation in a preceding paragraph. This $\bar{R}$, .0012", multiplied by the 2.58 factor gives a result of .0031". The drawing for the motor end shield (dimension C, Figure 1) called for −.000", +.002", a tolerance spread of .002".

The quality control statistician would report from the figures thus far gained that the boring operation, if continued in the fashion it was running the day the Work Sheet half-hourly measurements were obtained, would inevitably make scrap and rework. (In fact, "detailing" or 100% gaging of the day's work showed 16% of it oversized, 11% undersized; a total of 27% out of tolerance.)

The next natural question is: if the statements above are correct, to what

average Range, or $\overline{R}$, should this boring operation conform in order not to produce out-of-tolerance parts?

The answer is to transpose the formula, Tolerance Spread $= \frac{6\overline{R}}{d_2}$ by algebra so that it reads:

$$\overline{R} = d_2 \times \frac{\text{Tolerance Spread}}{6}$$

The required tolerance spread is .002"; d_2 is 2.326. Substituting in the above formula, we get:

$$\overline{R} = \frac{2.326 \times .002"}{6} = .000775"$$

The mathematician states, in other words, that if the operation can produce with an average Range, $\overline{R}$, from .0007" to .0008", there is small likelihood of out-of-tolerance work being produced; if, of course, the operator keeps the machine setting in proper relation to the blueprint mean. This latter phase of the control will be taken up separately.

It follows naturally that some sort of mechanical or engineering investigation should be made to determine what is causing the particular operation to exceed the mathematically prescribed R. In this case, for example, it was found that a certain additional and preliminary clean-off operation was necessary in order to prepare the motor end shield castings to provide substantial surfaces for more accurate chucking. Incidentally, other minor changes were made in the chuck, in the form tool and tool post, and the machine bearings were overhauled.

To assist in the investigation of the operation, another quality control technique had been adopted, a graphic system frequently called a "dot" chart. Figure 4 illustrates a section of this chart. To prepare it, a row of figures for relevant dimensional subdivisions was lettered on a sheet of ¼" coordinate paper as shown along the left-hand edge of Figure 4. Two lines were drawn in for tolerance limits at 3.970" and 3.972". Then, as each set of the five readings showing on the Work Sheet of Figure 3 was taken, the dimensional variations among the five pieces were tallied or recorded graphically in vertical rows of

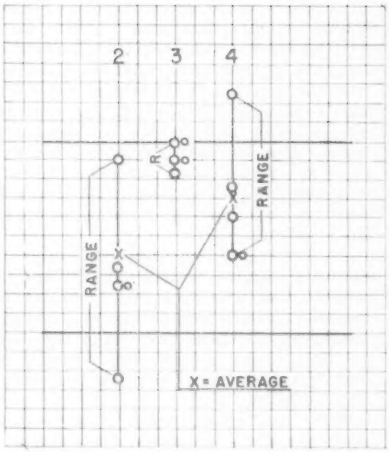
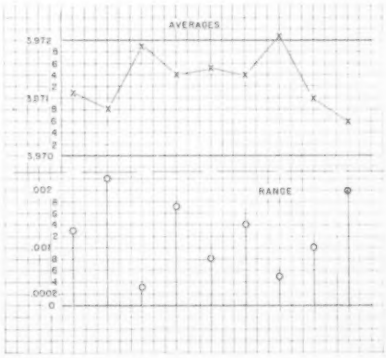


Fig. 5. A "dot" chart allows a graphic portrayal of "Range" and "Average". The "Range" of each group is bracketed, and the "Average" for each group is marked by X.

dots as they appear on the chart of Figure 4. The dot chart became a graphic reproduction of the work sheet.

The rows of dots indicate the way the machine was operating at each half-hour

Fig. 6. An "Average" chart and a "Range" chart on which are plotted the averages and ranges from the work sheet, Figure 3. These picture the same conditions as in Figure 4 but in another manner.

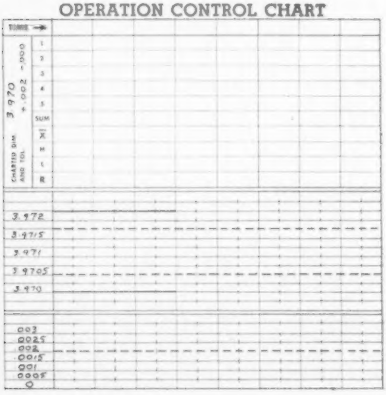


interval. Look at group No. 1 on Figure 4 and compare that aspect of the work with the way it was going a half hour later as shown by group No. 2. The next sample, No. 3, illustrates the operator's attempt, evidently, to tighten things down and to prevent oversized bores. But the machine soon went bad as indicated by group No. 4, and again came into line as at group No. 5. So it went, up and down, see-sawing back and forth all day.

A dot chart like that in Figure 4 allows a graphic description of "Range" and also of the "Average" spoken of earlier. See the section of the dot chart in Figure 5 where the Range of each group is bracketed and the Average of each group marked in its proper position by an X.

In routine quality control charting of this nature, the somewhat more cumbersome dot chart is usually replaced by the simpler pair of charts for Averages and Range. Figure 6 portrays an Average chart and a Range chart on which are plotted the Averages calculated on the Work Sheet of Figure 3, and the Ranges; the Averages appearing as a series of x's and the Ranges as dots or circles with vertical connecting bars. The charts of Figure 6 picture exactly the same conditions as the dot chart of Figure 4 but in another manner.

Fig. 7. The type of chart that is prepared for operation control.



The Averages on a quality control chart indicate the general trend of the work, hour by hour, either toward the high side of the tolerance or the low. The operator usually has control over the Averages by the manner in which he sets and controls the tool feed for tool wear and the like.

The Ranges point out the intrinsic dispersion of the work; in practical terms, the looseness, wear, eccentricity, expansions and similar gremlins popping out in the machine's mechanism.

Having overcome some of the gremlins in the motor end shield boring operation to the point where the operator could more surely hold nearer to the tolerance mean of 3.971" and to the point where the Range of the work ($\bar{R}$) could remain close to .0007", the next step was to maintain this sort of control.

For this purpose, a blank chart like that illustrated in Figure 7 was prepared and hung up at the machine. As the boring operation proceeded, an inspector appeared about every half hour, but not less often than once an hour. He took five pieces in succession from the machine at each visit, measured them, recorded his readings and calculated the Average and Range for the sample. Then he plotted the Average and the Range on the blank chart.

The results of a day's work and control of this nature are illustrated in Figure 8.

Observation of the charts of Figures 7 and 8 show that in the meantime something new has been added. There are horizontal dotted lines in addition to the heavy "tolerance" lines. These dotted lines are known as "control" lines. They mean that when an Average, or a Range, or both, cross or go outside of one of these control lines, the work the machine is producing very probably contains scrap and rework in excess of the prescribed 1%.

Two such incidents show on the chart of Figure 8; the Range went out of bounds at 9:30 and the Average at 10:30. If the work produced between 9:00 and 11:00, say, has been, first, segregated or, better, detailed free of out-of-tolerance work (100% inspection), the day's work on its way to assembly is virtually

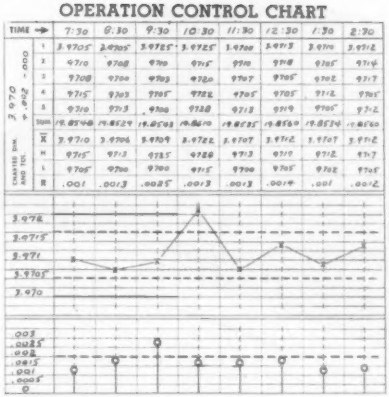


Fig. 8. The data that is recorded on the operation control chart shows both the results of the day's work and any tendency of dimension "C", Figure 1, to creep out of control.

free from defects as far as the one operation and dimension are concerned.

The values of the control lines were determined by two formulas: $A_2\bar{R}$ and $D_1\bar{R}$. Their respective positions on the chart are shown in Figure 9.

The $\bar{R}$ for the $A_2\bar{R}$ formula is the .0007" previously established. A_2 is another constant the statistician supplies. For a sample size of 5, the value of A_2 is .577.

To construct the blank chart of Figure 7, the $A_2\bar{R}$ formula was worked out with an $\bar{R}$ of .0007" and became .577 x .0007", or .0004". The upper tolerance is 3.9720". Subtracting .0004" from 3.9720" gives 3.9716" as the position on the Averages chart for the upper control limit. Similarly, the .0004" is added to the lower tolerance of 3.9700" to get the lower control limit position of 3.9704".

If or when, from then on, the calculated Average of a sample of 5 taken from the machine exceeds 3.9716" in value, or is less than 3.9704", the work the machine is then producing is "out of control" and substandard or out-of-tolerance pieces will very probably be found.

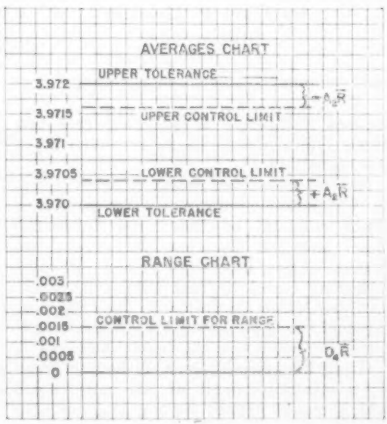
The position of the control limit for Range is calculated from the formula: $D_1\bar{R}$. In this case, the constant, D_1, is 2.114 (for a sample size of 5). The $\bar{R}$ is, again, .0007". Multiplying the two gives a value of .0015", which is plotted on the Range chart.

Where the Range of any sample exceeds .0015", again scrap or rework appears.

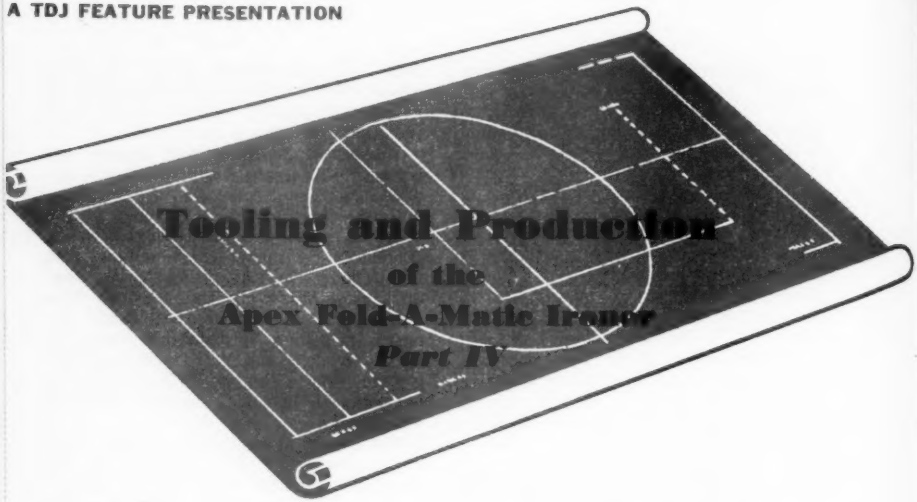
Earlier in this article the idea of the operator gaining an additional 10% in production without extra effort was mentioned. The control charts, like that of Figure 8, supply the answer. The operator is guided by the chart. He makes machine adjustments only or mostly when the drift of the Averages plotted, or the Ranges, indicate that he has gone or, better, is about to go "out of control."

The charts make the inspector's work more systematic. Hence in the end, in spite of the pencil work, he finds himself covering more machines. They save him and the operator from the ordinary errors of misjudging the condition of the work or the setup. Operator time is saved, usually, because fewer machine or tool adjustments are made under the chart system than when he or the inspector make rule-of-thumb decisions.

Fig. 9. A graphical representation of the determination of the control limits, as related to the "Averages" and the "Ranges", by the two formulas.



A TDJ FEATURE PRESENTATION



Tooling and Production of the Apex Fold-A-Matic Ironer

Part IV

by Carl F. Benner
Assistant Editor

Rough Core Drilling

Two cored bosses (E & F), Figure 11, are cast on the gear case to provide bearing and entrance facilities for the crank and universal coupling shaft assemblies. The holes through these bosses are bored to finished dimensions at a later operation, but at this point a rough core drilling operation is performed regardless of the fact that not much material has to be removed from the cored holes.

In die cast cored holes a draft of 5° to 7° included angle is desirable for rapid removal of the cores from the holes and the die cast part from the molds. Apex has experienced difficulty in boring cored die cast holes with draft on Bore-Matic machines, in that the boring tool tends to dig into the metal causing inaccuracies in the hole diameters.

Apex had two choices, either to specify a minimum draft on the cored holes which would permit boring the holes to the finished diameter in one operation or specify the standard draft and finish the hole diameter in two operations; rough core drilling and boring.

Minimum draft on the cored holes slowed up production on the die casting machines, due to the difficulty in removing the cores, so that the additional cost of the die cast part exceeded the two-operation cost of rough core drilling and boring. Because of this cost difference these two holes are rough core drilled and then finished by boring.

The crankshaft boss (E), Figure 11, has to be bored to a final 1.121/1.122″ dia. The specifications require that the core drilling enlarge the hole from the cored diameter to 1.110/1.105″ dia. through the boss. A standard 1.109″ dia. core drill is set up in one spindle of a four-spindle drill press to perform the rough drilling of this boss.

The universal coupling shaft boss (F), Figure 11, is finish bored to .969/.970″ dia. by 5/8″ deep. This counterbored hole is later threaded. The step-drilled diameter of the boss is enlarged to .953″ and 1.050/1.055″ from the cored diameters, and the outer face of the boss is spot faced by a combination step drill and spot facer (P), Figure 22. The core drill used in this operation differs from a standard twist drill in the angle to

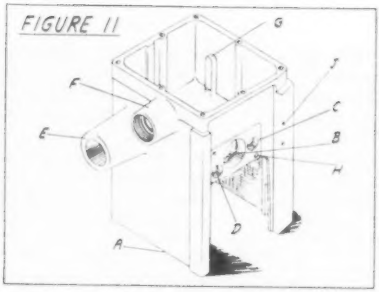


Fig. 11. Apex Fold-A-Matic Ironer gear case after all machining operations are completed.

which the lips are ground. A standard drill has a 118° included angle whereas the core drill angle is approximately 148°.

A drilling jig, Figure 22, is used for holding the gear case during these drilling operations. It consists of a base in two parts (X) and (Y), Figure 22. The bottom of the base (X) is relieved by $\frac{1}{32}$" leaving a 1" x 1" pad at each corner. Two locating pins are set in the upright member (Y) positioned to correspond with the two dowel pin holes in the bottom face of the gear case. The other parts of the jig are: side plate (Z); bushing plate (D); clamp plate (G); clamp shoe and screw (H); thumb screw and stud (J); spring button (K); cap (I); setting gage (M); and drill jig bushings (N and O).

Base member (Y), bolted upright on the left end of base plate (X), and side plate (Z), bolted in a vertical position along the rear edge of base plate (X), are fastened together by bolts along their vertical meeting edges. One end of the bushing plate (D) is bolted to the top surface of the side plate (Z) permitting the inserted drill jig bushings (N and O) to extend forward and line up with the cored bosses (E and F) which are to be drilled.

A clamp plate (G), bolted to the right end of base plate (X), supports a clamp shoe and thumb screw (H) located near its top and positioned so that the clamp shoe will meet the top face of the gear case when loaded in the jig.

A spring button assembly, composed of a spring button (K), cap (a disc 1⅛" dia. by $\frac{3}{16}$" thick) (L), compression spring (N), and two flat head screws, is located 2" from the right end of the base plate and 2½" from the front edge. A three-diameter, step-counterbored hole at this point bored upwards from the plate bottom (1⅛" dia. x $\frac{3}{16}$", ¾" dia. x $\frac{33}{32}$", ⅝" dia. x $\frac{3}{16}$") accommodates the spring button assembly. The spring button body (K) is ⅝" dia. by 1¼" long

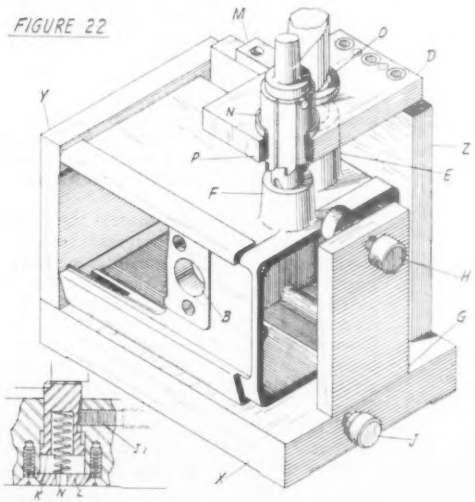


Fig. 22. Drilling jig for holding gear case while performing rough core drilling and spot facing operations.

over all with a flange (¾" dia. by $\frac{5}{16}$") at the bottom. A cavity (⅝" dia. by ¾" deep), drilled in the body of the button, accommodates the compression spring (N).

To provide a contact surface for the thumb screw, a flat ⅝" long is ground at 7° into the side of the button.

In installing this assembly in the base the spring button (K) is inserted through the three-diameter, step-counterbored hole in the bottom of the base. Its top extends beyond the base top surface but is prevented from going clear through by its flange nesting in the second counterbore. The compression spring (N) is next inserted in the button cavity and these are held in place by the cap (L) and screws. On the cap's periphery two countersunk half holes have been drilled into which the flat head screws sink to hold the whole assembly in place.

A counterbored and threaded hole (J) is located in the right edge of the base plate (X), 2" from the front edge and centered $\frac{5}{16}$" down from the top surface. The counterbored section of this hole is $\frac{5}{16}$" dia. by 1" deep and the ¼"—20 threaded section continues for ¾" beyond the counterbore to meet the three-diameter, step-counterbored hole just described. The thumb screw and stud (J), with a stud 2" long and a ¼"—20 thread 1" long, is inserted in the hole (J) in the edge of the base plate. When run in, the screw meets the ground angular flat on the spring button and when tightened it locks the button in the desired position.

To perform the core drilling operations on the bosses (E and F), the gear case is loaded in the fixture, Figure 22, by setting the locating pins installed in the left upright base member (Y) into the gear case dowel pin holes. The thumb screw (H) is then tightened to securely hold the case in place.

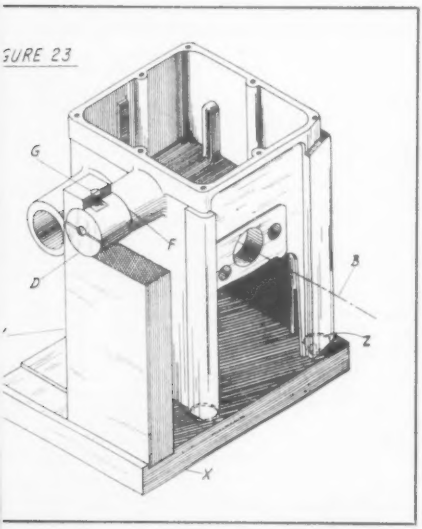
To compensate for any irregularities in the surface of the gear case which would ordinarily be in contact with the base of the jig, the spring button assembly just described is used. After the gear case has been securely clamped in the jig by tightening thumb screw (H), the spring button will have found its correct contact level through the pressure of the gear case exerted upon it. This level of the button is held by tightening the thumb screw (J), the end of which contacts the angular flat on the surface of the spring button.

The position of the spring button in the jig base makes its contact with the gear case surface directly under the two bosses to be drilled, thereby furnishing a support for the case while the bosses are being drilled in addition to its leveling function.

In order to definitely control the depth of spot facing, the universal coupling shaft boss end (F), Figure 22, a setting gage (M) is bolted to the top edge of side plate (C). By means of a stop rod clamped to the drill press quill, the downward travel distance of the drill press spindle is controlled by the rod striking the setting gage. The specified dimension to be held is 3.116"/3.122", from the spot faced surface of boss (F) to center line of worm shaft hole (B).

After the gear case has been clamped

Fig. 23. Checking fixture and flush pin used in checking the dimension from the spot-faced surface of the universal coupling shaft boss to the centerline of the worm shaft hole.



in the jig, the operator lowers the drilling spindles carrying the two core drills. The one core drill is a standard straight drill, while the other is a step drill inserted through and keyed to a spot facing tool (P), Figure 22. By this one operation the crankshaft boss (E) is drilled, and the universal coupling shaft boss (F) is step drilled and spot faced.

Spot Face Checking

To check the dimension (3.116/3.122", tolerance ±.003) from the spot faced surface of the universal coupling shaft boss (F), Figure 23, to the center line of the worm shaft hole (B), a flush pin gage is used in conjunction with a checking fixture, Figure 23.

The fixture components are a base (X), and end plate (Y), four jig buttons (Z), two locating pins, and a flush pin (D). The end plate (Y) is mounted in a vertical position on the left end of the base plate (X). Since it is essential that the angle between these two pieces be accurately held to 90°, a groove ⅛" deep is machined in the top surface of the base into which the end plate (Y) is set and fastened by bolts.

Two locating pins are set in the base, positioned to meet the two dowel pin holes in the bottom face of the gear case. To insure that the gear case will set level in the checking fixture, four jig buttons are inserted in the base. These are located so that the four bottom corners of the gear case will rest on them. After these buttons are assembled in the base, their top surfaces are ground level.

A flush pin (D), Figure 23, having a .006" step ground on one end and a flat (1/16" deep by ½" long) ground on its periphery, is inserted in the end plate (Y), located so that the pin's flat end meets the spot faced end of the boss (F) to be checked. A threaded hole tapped in the top surface of the end plate accommodates a set screw (G), which, when screwed in meets the ground flat on the flush pin surface, serving to retain the flush pin from becoming dislodged from the end plate.

To perform this checking operation, the inspector sets the gear case over the locating pins, permitting the case to rest on the leveling buttons. This brings the boss to be checked (F) opposite the flat end of the flush pin.

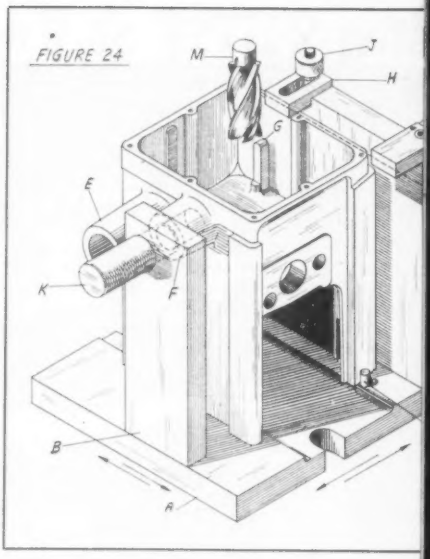


Fig. 24. Milling fixture for holding gear case while milling back-up boss cast on the inside wall of the gear compartment.

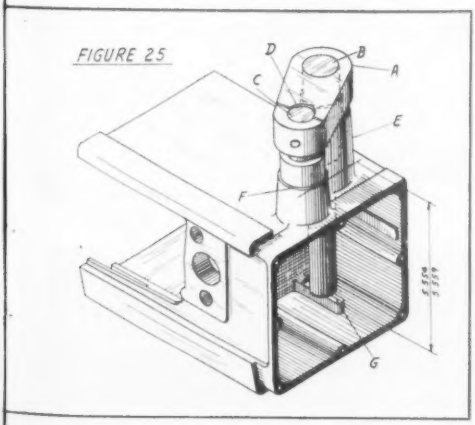


Fig. 25. Flush pin fixture used in checking the specified dimension from the spot-faced surface of the universal coupling shaft boss to the milled surface of the inside boss.

For purposes of distinction, the stepped end of the flush pin will be referred to here as the lower step and upper step. For the workpiece to pass inspection, the flush pin's lower step cannot protrude beyond the face of the end plate (Y) or the upper step fall within the face of the end plate. It can readily be seen that if the lower step did protrude beyond the face of the end plate, the dimension to which the boss was machined does not come within the tolerance specified and that the boss is too long. If the upper step falls within the face of the end plate then the dimension again does not come within the specified tolerance and the boss is too short. The inspector determines the position of the flush pin steps with his thumb nail.

Milling Inside Boss

A boss (G), Figure 24, cast on the inside wall of the gear case and located opposite the boss opening through which the crankshaft passes (E), Figure 24, serves to back up the end of the crankshaft, thereby prohibiting displacement of the shaft.

Because the end of the universal shaft boss (F), Figure 24, has been accurately spot faced, it is used as a reference sur-

SURE 26

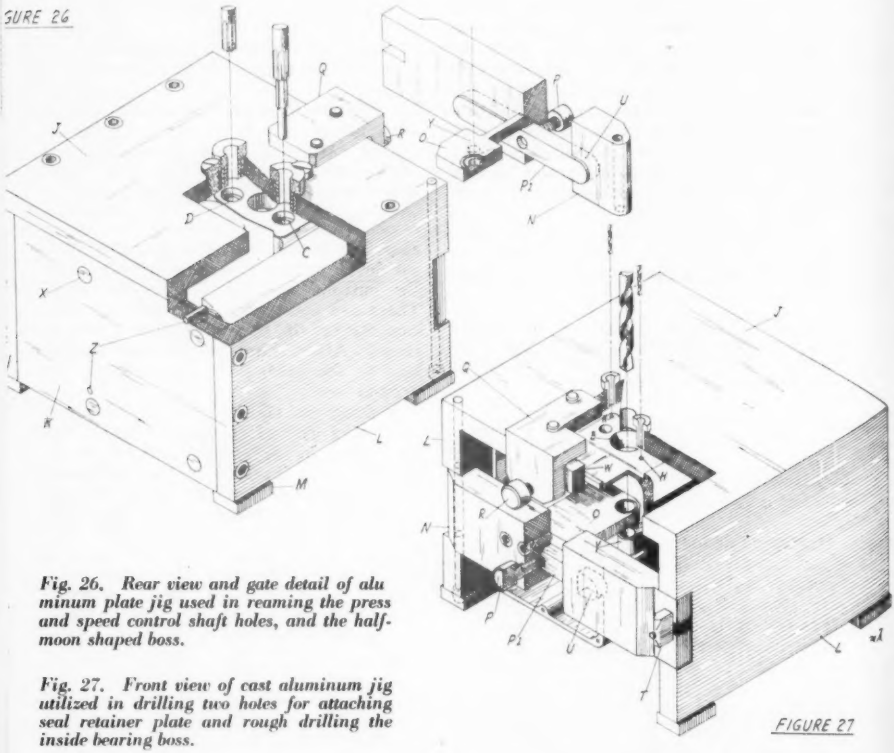


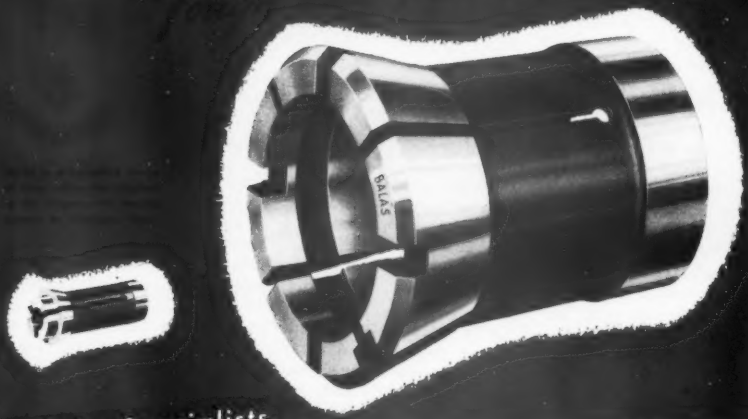
Fig. 26. Rear view and gate detail of aluminum plate jig used in reaming the press and speed control shaft holes, and the half-moon shaped boss.

Fig. 27. Front view of cast aluminum jig utilized in drilling two holes for attaching seal retainer plate and rough drilling the inside bearing boss.

FIGURE 27

You'll do MORE...You'll do BETTER with

BALAS CAM-GROUND COLLETS



built by Specialists

BALAS FACTORY DUPLICATE COLLETS FOR ANY MACHINE

improve your production!

You may never realize the difference a collet can make in the performance of your machine until you try Balas. Balas Collets are "cam ground"—they work faster, grip tighter and run truer. Balas Collets are built by specialists! They have many exclusive features that result in better production . . . yet they cost no more than ordinary collets. Why not get the complete story on Balas Collets—send coupon for free catalog today!

also

"MARTIN" MASTER COLLETS AND PADS

•

MASTER PUSHERS

•

PUSHER PADS

THE B LINE

BALAS COLLET MANUFACTURING CO.
Please send free copy of your Catalog No. 47.

NAME _____

TITLE _____

COMPANY _____

ADDRESS _____

CITY _____ STATE _____

face from which to establish the milled surface of the inside boss (G). This inside boss is milled so that a specified dimension of 5.554/5.559" is established between the milled surface of the inside boss (G) and the spot faced surface of the shaft boss (F).

A milling fixture, Figure 24, is used for holding the gear case while performing this operation. Its components are: a base (A); banking plate (B); end plate (C); setting gage (D); step plug (K); clamp plate (H); thumb nut and stud (J); and a brass banking thumb screw not visible in Figure 24.

The banking and end plates (B and C) are bolted on the left and right ends of the base (A) respectively.

A step plug (K) is located in the banking plate (B) so that it will enter the universal coupling shaft boss (F) when the gear case is loaded in the fixture. The plug is stepped to conform to the stepped counterbore of the shaft boss and assists in positioning the case in the fixture. Setting gage (D) is bolted to the front top surface of the end plate.

The slotted clamp plate (H), in conjunction with a thumb nut and stud (J), installed on the rear top surface of the end plate, serves for clamping the gear case down on the fixture base. A brass banking thumb screw (not visible in Figure 24) is located in the end plate (C) directly opposite the stepped plug (K). Two locating pins (L) are set in the base in such a manner that the right bottom end of the gear case can be placed between them, thereby serving to prevent the bottom of the case from shifting during the milling operation.

With the fixture clamped on a vertical milling machine table, the operator loads the fixture by placing the case between the two locating pins (L) and then inserting the stepped plug (K) into the counterbored boss (E). The banking thumb screw is then tightened, forcing the spot faced surface of boss (F) against the banking plate, thereby squaring the case in the fixture. The slotted clamp plate (H) is then slid over the top edge of the case and the thumb screw (J) tightened, thus clamping the case in the fixture.

To set the milling cutter preparatory to making the milling cut, the operator moves the milling machine table toward the left until a milling cutter tooth almost touches the end of the setting gage (D).

By placing a feeler gage between the cutter tooth and the setting gage, the cutter is positioned for the depth of cut to be taken across the inside boss. The operator then moves the milling table forward until the cutter is over the inside boss (G) and next lowers the milling spindle to make the cut. Figure 24 shows the inside boss (G) after the milling cut has been completed.

Inside Boss Checking Fixture

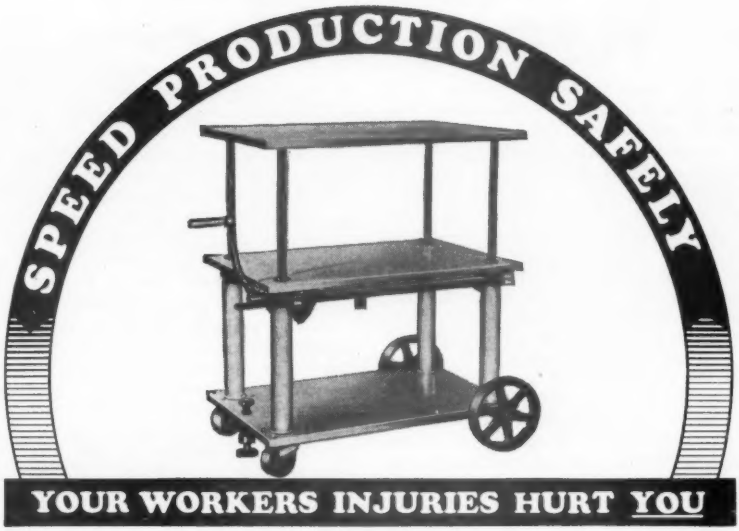
Checking the specified 5.554"/5.559" dimension from the spot faced surface of the universal coupling shaft boss (F), Figure 25, to the milled surface of the inside boss (G), a checking fixture is used. This fixture is made up of three parts: a gage plate (A); shaft (B); and gage (C). • Because these two surfaces are offset, the checking is accomplished through a gage plate. Two holes of 1" and .752" dia. are drilled in it on 1⅞" centers. From the center line of the .752" dia. hole to the end of the gage plate, a .005" step (D) is ground on the upper surface to serve for flush gaging.

A shaft (B) 7⅝" long is turned to three diameters, (1) 1" by 1" long, (2) 1.120" by 2⅝" long, and (3) ¾" by 4" long. The 1" by 1" section is inserted in the 1" dia. hole of the gage plate by press fit. The 1.120" dia. fits the hole drilled through the crankshaft boss (E) through which it is passed during the checking operation.

The gage pin (C) is 2.060" long with two diameters of 1¼" and .750" turned on it. A flat ⅜" long by $\frac{1}{16}$" deep is ground on the periphery of the .750" section. This gage pin is inserted in the .752" hole of the gage plate and is retained in place by a set screw meeting the flat section; however, the screw is not set tight because the gage pin must be left free to move up and down for gaging purposes.

Checking this milling operation is performed simply by inserting the shaft (B) of the gage through the crankshaft boss (E), allowing the shaft's lower end

(CONTINUED ON PAGE 96)



When weight must be moved . . .

send one man and Portelvator

Raises, lowers, transports, levels and supports overhanging work. Forms a work bench when and where you need it. May be worked at from all sides. One man can safely lift and carry loads usually requiring the combined strength of four.

Three table surfaces. Four point support. Fast lift and slow lift mechanism. Self locking at any height. *Will not tip or slip.* Positive floor lock.

Standard Model capacities 1,000 to 5,000 pounds. Special models designed and built on order.

WRITE FOR BULLETIN P-47

THE *Hamilton* TOOL COMPANY

832 SO. NINTH STREET · HAMILTON · OHIO · U · S · A

SEE ADVERTISERS INDEX, PAGE 83, FOR KEY NUMBERS

Production Count of Plastic Molded Parts

by
D. A. Dearle*
New Britain, Conn.

In any manufacturing process it is imperative that accurate production records be maintained. This is important for two reasons. In the first place, the amount of goods produced by each employee has to be ascertained if piecework rates are to be applied. Secondly, the differential between goods produced and goods sold has to be known from day to day. If mistakes are made in the recording of daily production figures, such errors will cause considerable trouble to the company from a sales, as well as a production, standpoint.

In the production of metal parts, fabricated from either wire or strip stock, it is not a difficult task to keep accurate production records. If the gauge of the metal is known, the finished pieces can be weighed and the weights then converted into the total number of units. This method of obtaining production count can be utilized regardless of the fabricating operations performed.

The molding of plastics, however, presents a difficult count problem. In place of the finished blanks and perforated strips found in metal fabrication, compression molded items emerge from the dies in the form of molded products and excess material. Varying amounts of flash are attached to each molded part and a weight-count system can seldom be used effectively.

Inasmuch as it is necessary to maintain a close record of molding plant activity, both for payroll and production purposes, some kind of positive method of counting molded parts has to be established. In order to obtain accurate production count, one or more of the following operations must be utilized:

1. Make a physical count of all pieces produced at the press.
2. Remove all excess flash, weigh the work, convert weight to count.
3. Multiply the number of cycles, made over a known period, by the number of cavities in the respective molds.

Let us investigate these three methods and compare their relative merits.

Physical Count

In the majority of cases, orders for compression molded parts involve large volume production. Consequently, multiple-cavity dies are used for producing the pieces. While it is quite possible to have the press operator actually count all the work molded during his shift, such practice is inefficient from an operating standpoint. In instances where molded parts happen to be exceptionally large, the pieces may be counted at the end of each shift without involving too much additional labor cost.

Radio cabinets, clock cases, or other housings of similar proportions require special handling at the press and therefore it is often practical to record the number of units produced by means of a physical count. Large items are the exception, though, and other ways have to be devised for obtaining the count.

Weight-count

After the flash has been removed, small or medium size molded parts can be weighed to obtain a count that is reasonably accurate. For best results, a full heat from the die has to be weighed and an average unit weight thus obtained. Actual count can then be computed, either by dividing the total weight by the unit weight, or by multiplying it by the unit weight reciprocal. In order to maintain accuracy, a daily check of unit weight is necessary.

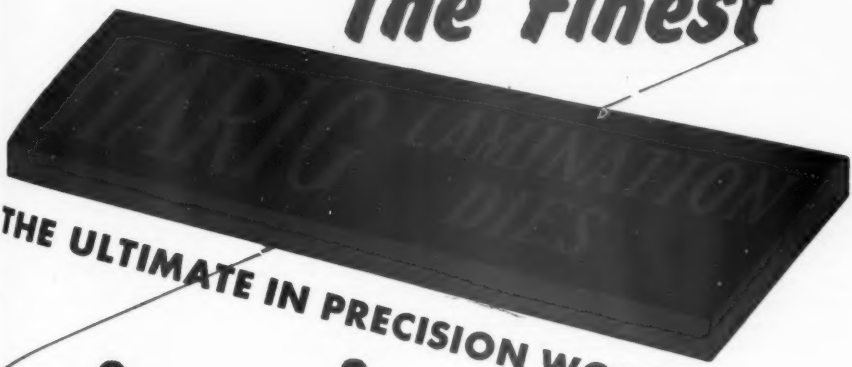
Variables in Molding

As the result of variations in molding conditions, differences occur from day to day in the net weight of molded pieces. In the first place, molding materials dif-

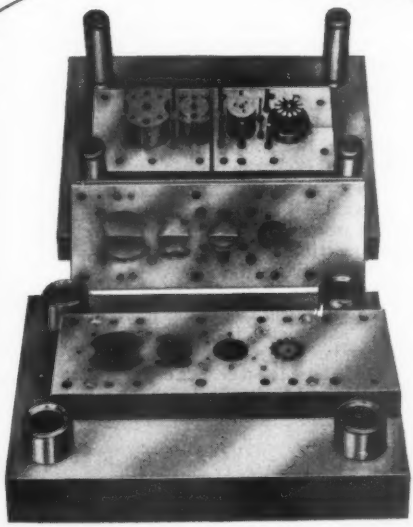
*Author of "Plastic Molding & Plant Management."

YOUR PRODUCT DESERVES

The Finest

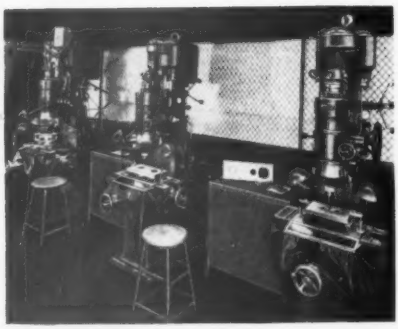


THE ULTIMATE IN PRECISION WORKMANSHIP



ALSO STAMPING DIES OF ALL TYPES, JIGS, FIXTURES, GAUGES, SPECIAL MACHINE WORK.

A Typical HARIG LAMINATION DIE



View of Part of Our Modern, Highly Efficient Plant

Your Inquiries Invited

HARIG

MANUFACTURING CORPORATION

fer widely in their specific gravities. Hence, any change in compounds used at the press affects the unit weights of the molded parts. Secondly, flash thicknesses increase during a production run because cavities tend to sink slightly in the mold frame. Finally, variations in flash sections occur with every slight deviation in the amount of powder used in loading the cavities, and hence the volume of the molded part differs proportionately. In order, therefore, to catch any fluctuations in the unit weight of the pieces being molded, it is necessary to make a daily check-up.

At first glance it would appear that the weight-count method on defined parts might solve the problem of keeping production records in order. Unfortunately, though, it is not always possible to remove the flash from pieces just as soon as they are molded. Flash is removed in many different ways by such operations as hand filing, sanding, trimming, wire brushing, etc. Tumbling barrels are also used extensively.

Because of the wide diversification of finishing operations, a week or more may elapse before the molded products finally emerge as finished items. Inasmuch as piece-work rates have to be converted into employee earnings at the earliest possible time, such delays will seriously hamper the payroll department. Furthermore, production records will be upset considerably if it is not known how many parts have been molded daily. Hence, in most instances it is impractical to use a system of net weight counting on compression molded parts. Let us, therefore, consider the third method. This plan consists of keeping a record of the number of cycles made at the press, and multiplying the cycles by the number of mold cavities.

Cycle Count

There are many ways in which total cycles per shift can be recorded. For instance, the press operator can be furnished with a pencil and pad to be used for jotting down a mark each time he ejects a load of work from a machine. Sometimes the operators are provided with small pellets and an empty jar at each press. Thus equipped, the molder deposits a small preform into the jar at the end of each cycle and, at the conclusion of his shift, counts the number of pellets collected. Both of these methods are crude, inasmuch as the accuracy of production records depends entirely upon the integrity of each molder.

A marked improvement over this system is to be found in the use of automatic counters. These counters may be installed on the stationary part of each machine so that the recording arm is actuated by the opening and closing of the press. With an installation of this type the press operator does not have to spend any time keeping records of his production activity. Instead, the foreman can record the numbers appearing on the counter at the beginning and ending of each shift, and thus determine the total number of machine cycles made.

This method is not entirely satisfactory because its operational efficiency

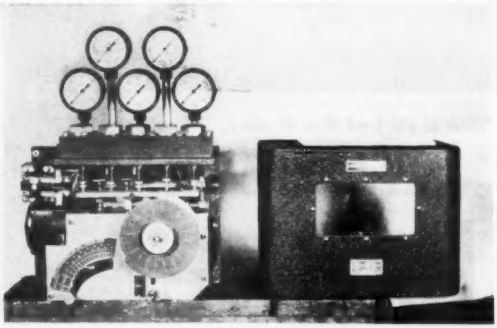
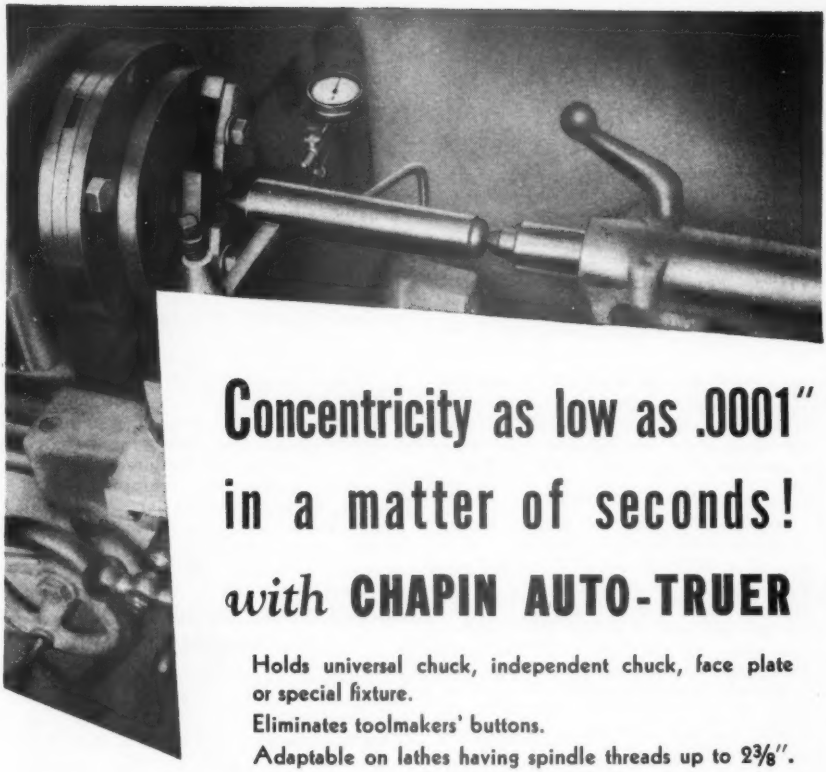


Fig. 1. Cycle controller used for maintaining uniform cures on compression molded parts.

Photo courtesy Secly Instrument Co., Inc., Niagara Falls, N. Y.



Concentricity as low as .0001" in a matter of seconds!

with CHAPIN AUTO-TRUER

Holds universal chuck, independent chuck, face plate or special fixture.

Eliminates toolmakers' buttons.

Adaptable on lathes having spindle threads up to 2 3/8".

● **Amazingly simple!** Any lathe operator can master the CHAPIN AUTO-TRUER in just a few minutes.

● **Easy to install!** The CHAPIN AUTO-TRUER is mounted on the lathe spindle—then the chuck, face plate or special fixture is mounted on the AUTO-TRUER.

● **Pays for itself!** Cut your labor costs by saving time—on Tool Room or Production Lathe. Eliminate the waste motion and "cussing" of the conventional "trial-and-error-method" of centering the work.

Write for Detailed Description.

Certain Territories open for Dealers.

CHAS. E. CHAPIN CO.
INCORPORATED

East Rutherford, N. J. • Established 1893

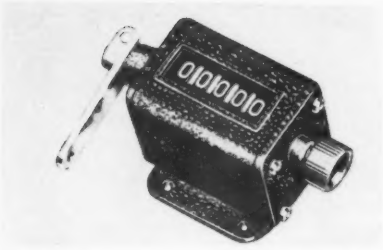


Fig. 2. Type of counter used on inside of cycle controller box.

Photo courtesy Veeder-Root, Inc., Hartford, Conn.

depends upon the honesty of the individual operators. In other words, an externally located counter makes it possible to record by manipulation many more cycles than those actually made.

Cycle Controller

One way in which an accurate record of molding cycles can be obtained is by use of a box-type cycle controller such as the one illustrated in Figure 1. This type of instrument is designed primarily for the purpose of maintaining uniform cure times on compression molded parts. Preliminary setting of a gear shift lever in the box permits the choice of any desired cycle time. Cam action on the slowly rotating disc regulates the opening and closing of the press, and also allows for a set gassing of the material. Aside from the operational advantages of a cycle controller, this device serves excellently to house a production recording instrument.

If a small counter, such as the one shown in Figure 2, is installed inside the box, the lever can be positioned so that the number will turn over each time the controller cam makes a complete turn. Thus, when the controller box is locked, the counter becomes tamper-proof and no cycle can be recorded unless the press is in operation. With an arrangement such as this, efficient production count can be obtained and other methods of recording can be discontinued.

By using enclosed counters, the foreman or press operator has to merely write down the numbers appearing at each machine at the start and finish of the shift. The result obtained by subtracting one number from the other determines the total number of cycles made. When this figure is multiplied by the number of cavities, the production per shift is easily ascertained.

When molded products require a series of expensive finishing operations they are usually given a first inspection soon after they leave the molding room. In such cases it is possible to combine inspection with a counting operation, but in many instances a first inspection is neither necessary nor economical. Therefore, if the cost of first inspection can be eliminated, this saving can be applied against the expense of a cycle controller and counter.

Regardless of the method used to determine production count, the installation of a counter at the press is beneficial. It permits the operator to read directly from the counter the number of cycles made, and gives him a constant incentive to improve previous production records. Moreover, the figures recorded on the counter can be utilized to check any alternative counting methods.

Injection Molded Parts

Different conditions arise when it comes to keeping records of the parts produced from injection molding machines. Injection molded parts usually leave the dies in finished form and, except for clipping gates, there is no need for further finishing. The total number of parts produced can therefore be obtained with a fair degree of accuracy by the weight-count method. Of course, accuracy can be maintained only if the press operator discards the faulty pieces during the molding operation. Unfilled pieces, shots with heavy flash, and all rejected parts have to be kept separate from the good pieces if an accurate count is desired.

A small counter can be positioned on an injection machine so that the counter lever arm will register each time the plunger moves forward. An installation such as this, however, will serve more as a check against weight-count results than as a basis for recording the total number of parts produced.

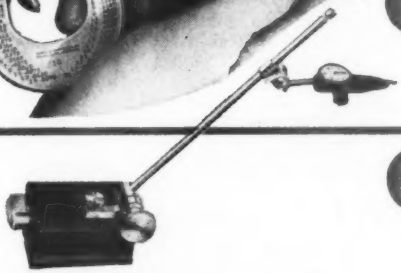
3 IMPORTANT ADDITIONS

TO THE BROWN & SHARPE LINE

1

BALL ATTACHMENT No. 226
for micrometer calipers

This attachment snaps on either anvil or spindle end of micrometer caliper to facilitate measurement of curved surfaces. Hardened steel ball bears firmly against measuring surface. Fits most micrometers with conventional anvils and spindles. Inexpensive.



2

DIAL TEST INDICATOR No. 743
with fine adjustment and magnetic base

Makes difficult-to-reach measurements easy, accurate. Permanent magnet base holds indicator firmly to any iron or steel surface. Fine adjusting nut permits exact setting. For sale only in the United States of America and its Territories.

3

CENTER AND SMALL HOLE ATTACHMENT No. 573
for vernier calipers

Quickly converts a 6" or 150 mm. vernier caliper into a precision divider, or provides jaws with small points which permit measurements between very small holes. Set includes 2 each; clamps, center points, small hole points.

THESE INGENIOUS NEW DEVICES . . .

permit faster, simpler measurement of unusual-shaped parts, center distances or ordinarily inaccessible places with complete confidence in the accuracy of results. Their quality of craftsmanship and materials is typical of Brown & Sharpe standards in every respect. Write for complete details. *Brown & Sharpe Mfg. Co., Providence 1, R. I., U. S. A.*

We urge buying through the Distributor

BROWN & SHARPE TOOLS

Optics Aid Work Location

by
Robert Hutcheson*
London, England

During the past ten years or so, the use of the toolmaker's microscope to facilitate the location of work for accurate machining has gained favor. This period has seen the development of much British-made optical equipment for workshop use, and two recent British inventions in this sphere have been designed for accurately centering workpieces for drilling and boring.

The normal method of using a toolmaker's microscope directly in the spindle of a drilling, milling, or similar machine, involves removal of the microscope and its replacement by the drill chuck each time a fresh setting of the work is made. Now, this disadvantage can be obviated by the use of the chuck, Figure 1, with which an optical system is embodied to give the equivalent of a combined drill chuck and microscope. Further, the use of this new tool enables the lesser skilled operator to locate holes with considerable accuracy, and as the chuck is suitable for general machine shop use, it may be said to bring some of the precision of the toolroom to the general production shop.

When Hole Is Necessary

The optical system is incorporated in a housing carried by a No. 2 or No. 3 Morse taper shank, the lower end of which is formed as a tapered spigot to fit a Jacob's drill chuck, or any other make of chuck that can be adapted to fit the shank. A screwed neck on the shank, just above the spigot, has a nut by means of which the chuck can be forced off the spigot when necessary. If a hole does not already exist right through the chuck it is necessary to drill one so that the work can be observed through the chuck.

The eye-piece of the microscope is at the side of the housing and through it can be viewed the cross-lines on the graticule and the markings on the work, the work then being adjusted until the center of a hole to be drilled, as marked out on the work, coincides with the lines on the graticule.

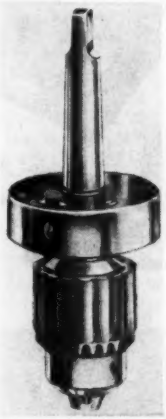


Fig. 1. The Optical Drill Chuck incorporates an axial bore through the body of the chuck. This permits locating the work on the optical axis which is common to the axis of rotation, and insures that holes will be drilled "as sighted". Photo courtesy Machine Shop Equipment, Ltd.

*Editor of "Machine Shop Magazine".

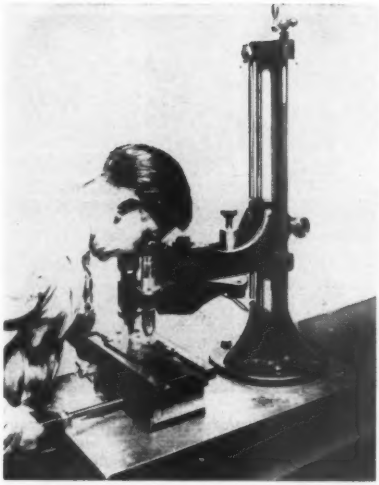


Fig. 2. The operator is manipulating the table adjusting screws of the "Centrefinder" to bring the scribed center lines on the work truly beneath the graticule of the toolmaker's microscope. When this is done he will index the head assembly to bring the drilling spindle precisely over the scribed center. Photo courtesy George H. Alexander Machinery Co., Ltd.

Focussing of the optical system to suit the sight of the user, so that the graticule cross-lines appear sharply defined, is accomplished with the aid of the small knurled wheel projecting through the top of the housing. Focussing of the microscope onto the work is done by raising or lowering the machine spindle. Really critical focussing is not required by reason of the comparatively low magnification (about 8×) and the depth of focus of the optical system.

The chuck can be supplied complete with the shank and optical system, or the combined shank and microscope can be fitted to a customer's own chuck. The complete optical chucks are supplied in two capacities, 0 to ½ inch, and ⅛ to ⅝ inch.

Precise Location

It will be appreciated, of course, that incorporation of the microscope will not correct run-out of a chuck. It is, however, possible to obtain a precise location of the axis of rotation over the work and, providing the operator then uses care when entering the drill into the work, any effect of run-out will be common to a series of holes and therefore will not affect their relative spacing.

All mechanics are aware of the difficulty of placing a center punch mark exactly at the intersection of two lines, and the subsequent difficulty of picking up the center mark with a drill. Therefore, the second British invention will interest many engineers; it enables a marked-out center to be spotted to give a precisely located center which is large enough to enable a drill, in a drilling or milling machine, to pick it up accurately.

This centering machine is carried on a surface plate measuring 28 by 17 inches, Figure 2. In brief, the purpose of the machine is to locate the work under a microscope which can then be swung aside to bring a drilling spindle accurately over the work.

The work is clamped to a T-slotted table that can be moved anywhere over the surface plate. The table can be shifted bodily by hand, and final adjustment can be accomplished with the aid

Fig. 3. Two styles of scribing blade as used on vernier height gages. The single bevel blade scribes a line of the pattern shown in Figure 3-A, and the double bevel blade "cuts" a line having the cross-section indicated in Figure 3-B. Photos, Figures 3, 3-A, and 3-B, courtesy George H. Alexander Machinery Co., Ltd.

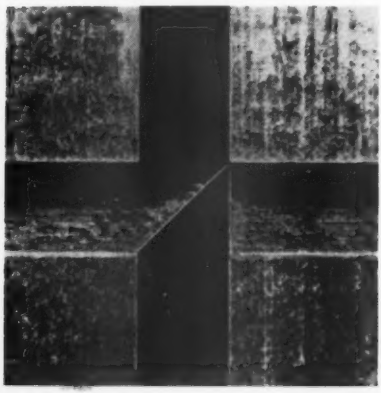
of a pair of screws. The screws work in nuts that can be clamped anywhere along two edges of the surface plate so that the screws can be effective at any position of the table. The table embodies an electro-magnet so that when the table has been positioned it can be clamped magnetically to the surface plate. This has the advantage that clamping does not disturb the table setting.

Two Positions

A socket bolted to the plate supports a ground steel column, up and down which a bracket can be moved by means of a screw. The bracket can be clamped to the column. At its free end, the bracket has a head so pivoted to it that the head can be swung in a horizontal plane, and indexed into either of two positions. The head carries the toolmaker's microscope and a small high-speed drilling spindle with a $\frac{1}{75}$ hp electric motor to drive it.

In use the table is adjusted until the center of the work (as shown by the intersection of two lines scribed on its surface) coincides with the intersection of the lines on the microscope graticule. Next, the head is indexed to its second position, which brings the drilling spindle precisely over the work; then the center can be spotted accurately and to a depth and size that will enable the center to be picked up accurately by a drill in a drilling or other machine.

Fig. 3-A. An enlargement of two intersecting lines scribed by a single bevel blade. Note that the intersection of the extreme bottoms of the grooves is so displaced from the center of the pattern as to prevent accurate location of a center punch mark.



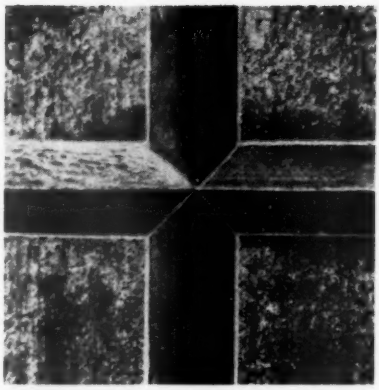


Fig. 3-B. This enlarged view of the intersection of lines scribed by a double bevel blade shows that the point at which the bottoms of the symmetrical V-grooves intersect constitutes a "self-centering center location" for a punch point that can be "picked up" readily and with a consequent high degree of accuracy.

This process can be repeated quite rapidly for each hole center that is to be spotted, and accuracy of location can be maintained to within 0.001 inch.

The sliding bracket and indexing head are aluminum castings bushed with centrifugally cast silmachrome liners. The indexing plunger is hardened, ground and lapped, and works in hardened tool steel bushes. Work up to 17 inches high can be accommodated and the depth of throat is 12 inches.

The drilling spindle and quill form a unit that can be removed from the head, and is of the same type as that which the makers fit to their precision engraving machines. It is, therefore, accurate, rigid and capable of running at a high speed. A spade type of cutter is used for center spotting, and to ensure accuracy cutter grinding can be done by removing the complete quill and mounting it, with the cutter in the spindle, in

(CONTINUED ON PAGE 85)

"GO TO A SPECIALIST"

When competition begins to intensify during a period of high costs, more ingenious tooling usually becomes the manufacturer's assurance of profitable production.

Every kindof tooling that reduces operations or increases runs or otherwise improves processing tends toward lowering of costs.

Members of the National Tool & Die Manufacturers Associaton are specialists in the designing, developing and building of special tools, dies, molds, jigs, fixtures, gages, special machines and accessories.

In the industry are highly skilled craftsmen and most modern tool and die making and machine building facilities. Their breadth of industry experience enables them to know the right and wrong of a tool design, a method or a process.

We invite you to call members of the National Tool & Die Manufacturers Association to help you plan your tooling programs. You will profitfromexperienceandskill.

NATIONAL TOOL & DIE MANUFACTURERS ASSOCIATION

1412 UNION COMMERCE BUILDING • CLEVELAND 14, OHIO

AN INVITATION

Members of the Contract Tool, Die & Machine Industry who are not yet members of the Association are invited to make inquiry about the benefits to be derived from such membership. They include an exchange of current operating data and statistical information from which more profitable individual shop operation as well as a stronger special tooling and machinery industry can result.

SEE ADVERTISERS INDEX, PAGE 83, FOR KEY NUMBERS

AUTHORITIES commend

PLASTICS MOLDS

Design • Construction • Use

By GORDON B. THAYER

DUREZ PLASTIC NEWS . . "If you are going into the subject of plastics thoroughly, you'll want this book. If you are designing for plastics, building molds, or molding, we believe you'll get your money's worth."

MODERN PLASTICS . . ."is an authoritative volume which offers an important contribution to the subject of mold designing and construction. A ready reference such as this is invaluable to anyone in the plastics field."

GEORGE K. SCRIBNER, Pres. Boonton Molding Co. . . . "It is one of the most difficult of tasks to describe minutely a complicated mechanical procedure and keep it both understandable and easy to read. Mr. Thayer has done both in his description of the detailed processes of mold design and construction."

PLASTICS MOLDS

speaks with AUTHORITY

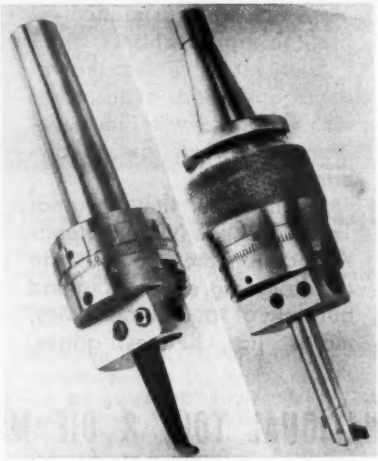
The new, third edition of *Plastics Molds* speaks with the knowledge and experience of Gordon B. Thayer, one of the Industry's foremost authorities on the design, construction and use of plastics molds.

This book is thoroughly practical and understandable and employs more than 200 illustrations, including many workable drawings, tables, and charts, in telling its know-how story.

Price $5.00 per copy prepaid.

New E-Z-Set Boring & Facing Tools

Completing two and one-half years of development work, the Maxwell Company, producers of the "Master" line of boring heads, now announces two new series of boring and power facing tools. Both new tools are smooth and circular in shape, providing maximum safety of



operation and ease in handling.

Series No. 30 E-Z-Set Boring Head (left in illustration) features compactness, ease of adjustment, and relative strength. The unusual capacity of this tool is obtained by a three-position boring bar location in the head. Available in models Nos. 30, 31 and 32, and having maximum boring bar capacities of ½", 1" and 1½" respectively, each tool covers a boring range of ⅜" to 20".

Series No. 40 Power Facing Tool (right in illustration) is available in models Nos. 40, 41 and 42. This series possesses the same boring capacities as series No. 30 tool, plus the power facing gear arrangement, which transmits reduced machine power to the facing tool.

Both E-Z-Set tools have interchangeable shanks and are universally adaptable to any jig bore, boring mill, automatic, or drill press.

Additional information will be forwarded by the Maxwell Co., Dept. 42, 225 Broadway, Bedford, Ohio, or circle INFORM-A-GRAM Key No. D26.

Gutenberg examining the first paper to be printed with movable type — about the middle of the 15th century.

KOOLPORE® was unheard of then!

Yes, there was no word about KOOLPORE grinding wheels on the first paper to be printed with movable type, but today there's plenty of good words about KOOLPORE — both in print and throughout industry.

These BAY STATE abrasive products, with their large pore spaces, are giving an outstanding performance on countless SURFACING and TOOL and CUTTER JOBS that require extra coolness of cut, and fast, heavy removal of metal.

Here's 5 features that make KOOLPORE grinding wheels superior:

1 — Faster Cutting
2 — Cooler Cutting
3 — No Chip Jam
4 — Greater Clearance
5 — Increased Production

Write for Koolpore folder which includes specifications.

Branch Offices and Warehouses — Chicago — Detroit
Distributors — All Principal Cities

BAY STATE®

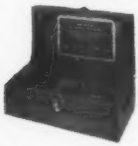
Top Performance Consistently Duplicated

BAY STATE ABRASIVE PRODUCTS CO., WESTBORO, MASSACHUSETTS, U. S. A.

THE TOOL YOU WANT WHEN YOU WANT IT...

... with CONTINENTAL INTERCHANGEABLE COUNTERBORE

The Continental Counterbore is a favorite standard cutting tool in all types and sizes of machine shops. It is of rigid and simple construction with patented features. The Continental indestructible drive is composed of two driving lugs formed on the cutter shank, with two corresponding abutments on the inside of the holder. There is an aligning bearing above and below the driving lugs that brings the cutter and holder concentric, and prevents the cutter from being forced out of alignment. The cutter and holder are engaged and disengaged by simply revolving the cutter a quarter turn by hand. *No tools or other equipment are necessary.*



Continental Interchangeable Counterbores are available in a choice of three sets. Set No. 1 (illustrated), for the small shop, includes cutters up to 1 1/16" diameter, with two holders.

CTW

40—32

CONTINENTAL TOOL WORKS

DIVISION OF EX-CELL-O CORPORATION

DETROIT 6, MICHIGAN

SEE ADVERTISERS INDEX, PAGE 83, FOR KEY NUMBERS

New Mechanical Engineering Building For Illinois Institute Of Technology

John T. Beatty, president of the United Specialties Company, was recently appointed chairman of the Mechanical Engineering Division of the Special Development Program campaign of Illinois Institute of Technology. This announcement, made by Harris Perlstein, general chairman, also said that Mr. Beatty's division will be primarily devoted to the provision of funds for the construction of the proposed new Mechanical Engineering building, part of the Institute's $15,000,000 modernization program.

The Mechanical Engineering building at Technology Center—Illinois Tech's campus—will be a $900,000 structure, Mr. Perlstein stated. He further explained that it would be equipped with a steam laboratory, an internal combustion engine laboratory, and a unique machine design room and laboratory enabling students to design industrial machines and then take them out of the paper stage by actually building them in the laboratory. Architecture for the building will be of the modern theme, Mr. Perlstein added.

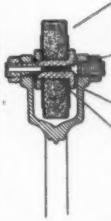
* * *

Standardization Advocated

Standardization of terminology and abbreviation for designating bolts, nuts, and screws, rivets, and other related products in the fastener industry is advocated in a recent compilation published in "Fasteners", the official publication of the American Institute of Bolt, Nut and Rivet Manufacturers, Cleveland, Ohio. Recommended abbreviations for the various types of fasteners are given, and a standard terminology and abbreviations for use on drawings, orders, invoices, stock lists and other records. Producers feel that a common set of these terms throughout the industry will bring about an enormous saving in time and money by facilitating readily understandable records and expediting operations.

HARDENED LUBRICATED HUB and CENTERS Improve Dressing Cut Repairs

Abrasive Wheel Dresser



- Special Dressing Wheel dresses wheels any hardness.
- Hardened tool steel centers — hollow for oiling — adjustable for wear.
- Hardened tool steel hub.
- Oil wick — lubricates Hub and Centers.

Dresses grinding wheels with scrubbing action that produces smoother, faster cutting surface than conventional metal dressers. Dressing wheels last longer, are easier to replace. Four sizes for dressing smallest to largest wheels.

Buy them from your nearest "Knock-Out" Jobber or Mail the Coupon TODAY!

K.O.LEE COMPANY

ABERDEEN, S. D.

K. O. Lee Company
1115 First Ave. S.E., Aberdeen, S. D.
Please send us completely illustrated bulletin describing "Knock-Out" Abrasive WHEEL DRESSERS.

Name.....

Address.....

City.....State.....

Mr. C. R. Burt

Burt Heads Potter & Johnston

Clayton R. Burt has resigned as Chairman of Niles-Bement-Pond Company of West Hartford, Connecticut, and will assume the presidency of the newly-formed Potter & Johnston Company, Pawtucket, Rhode Island, which has been purchased by Niles-Bement-Pond. Potter & Johnston is well known in the manufacture of production machine tools. Among its officers are: Frederick U. Conard, chairman of the board; E. P. Gillane, vice-president and controller; J. Earle Makant, vice-president and factory manager; J. Potter Cunningham, vice-president and sales manager. Potter & Johnston's new president, Mr. Burt, is a nationally known figure in machine tool circles, and has been active for many years in both business and civic circles. His resignation from Niles-Bement-Pond was accepted with a rising vote of tribute for his 24 years of outstanding service and leadership. A past president of the National Machine Tool Builders' Association, Mr. Burt is a director in many other companies.

It is probable that Potter & Johnston sales will be combined with the national sales staff of Pratt & Whitney, Division Niles-Bement-Pond Company. The acquisition of Potter & Johnston production machine tools rounds out the Pratt & Whitney line of precision machines without any competition conflicts. The combination of the two well known lines of machine tools, plus the high reputations of both companies for quality products, should prove advantageous from both a customer and a manufacturing standpoint.

When you want something "Special"
Specify
GUILD
TRADE MARK REG.
Special TOOLS and REAMERS
H. S. S. or Carbide Tipped
You can be certain of getting the exact tool you want . . . exactly as you want it . . . exactly when you want it.
Prompt quotations from your blueprints
METAL CUTTING TOOLS
AND MANUFACTURING COMPANY
3946 W. Eleven Mile Rd. • BERKLEY, MICH. • Phone Lincoln 7-5600

New Abrasive Belt Movie Filmed On Location

"A Machine of the Age" is the title of the new abrasive belt machining film which differs from previously released films on this subject in that it shows the abrasive belt machining methods in action. Many sequences of this film were taken during working hours and under actual working conditions in different shops throughout the country and demonstrate the high production rates possible on surfacing, stock removal and grinding operations when the abrasive belt machining method is employed.

Also, "A Machine of the Age" traces the development of abrasive belt machining from the earliest dry-belt models to its present status. Various models of machines, their application in tool and die rooms, production and maintenance departments, and polishing rooms are demonstrated. Also described are the different kinds of materials which can be machined by the belt method.

The film is black and white, sound, 16mm, and may be obtained free of charge from Porter-Cable Machine Co., 1714 North Salina St., Syracuse 8, N. Y.

★ ★ ★

Production On At GE Decatur Plant

General Electric has announced initial shipment from their Decatur plastics molding plant which is their sixth plastics plant and expected to become one of the largest factories of its kind in the country.

Approximately one-third of the 130 hydraulic presses scheduled to be in operation there have already been installed, most of which are being transferred from the General Electric plastics factory at Fort Wayne, Indiana, which is now being vacated to provide more space for GE's apparatus operations.

The new Decatur plant was purchased last year from the War Assets Administration. It comprises about 106,000 square feet and will eventually call for employment of between 400 and 500.

HERE'S PRACTICAL HELP

FOR TOOL AND DIE MAKERS!

Here, in one big, revised handbook you'll find all the information you need to make tools and dies that produce more . . . and cost less! "Tool Steel Simplified", originally published 10 years ago, is now completely revised to cover the newest advances in toolmaking and heat treating. Included in its 21 chapters is practical information that helps you save time and effort on each job.
You, like thousands of men, can profit by this big, revised handbook—a complete tooling library in one, beautiful cloth-bound book. Order today!

TOOL STEEL SIMPLIFIED

By Frank R. Palmer
Vice President
George V. Luerssen
Chief Metallurgist

The Carpenter Steel Company
564 Pages 355 Illustrations
$2.00 Postpaid in U.S.A.
Elsewhere $2.50

OVER 80,000 COPIES OF FIRST EDITION IN USE!

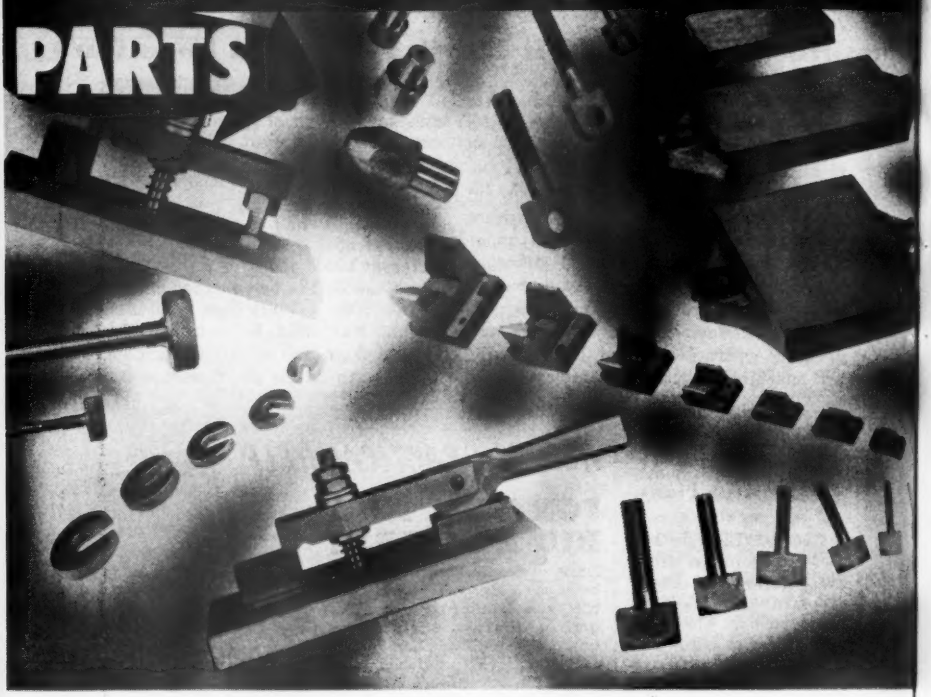
MAIL TODAY

THE CARPENTER STEEL COMPANY
Reading, Pa. Dept. 9B-1

Please send me, postpaid, your revised "Tool Steel Simplified". I enclose $2.00 ($2.50 outside the U.S.A.) in full payment of the book.

NAME _____ TITLE _____
FIRM NAME _____
MAILING ADDRESS _____
CITY _____ STATE _____
(Please Print)

DON'T MAKE *Jig & Fixture* PARTS



BUY THEM AT 1/3 THE COST!

NOBLE & STANTON STANDARD Jig and Fixture Components save you dollars—eliminate design time—cut tooling costs—and speed set-up. At approximately 1/3 the cost of custom building, you can get immediate delivery on any of the 300 NS Standards. Precision made from selected steels, these parts are heat-treated and hard chrome plated where practicable, to give added life.

Many plants are achieving SUBSTANTIAL SAVINGS by stocking a full line of NS Standards, using them over and over again on a variety of jobs. If Toolroom Savings interest you—investigate NS Standards Today!

5 Ways You SAVE With NS Toolroom Standards

1. Design Costs Cut 50% to 80%.
2. Toolroom Labor Savings up to 75%.
3. No Waiting—Immediate Supply.
4. 300% to 500% Longer Tool Life.
5. Parts can be Re-Used.

Write Today for Drawings, Specifications and Prices.

NOBLE & STANTON, INC.

Manufacturers of Tools, Gages and Their Accessories

1002 BROADWAY • BEDFORD, OHIO

NS

ADVERTISERS INDEX

In every instance the numbers listed opposite the names of our advertisers in the index below are both page numbers and INFORM-A-GRAM key-numbers

Ace Abrasive Laboratories 138A
Ace Mfg. Co. 144F
Acme Industrial Co. 127B
Advance Foundry Co. 134A
Allegheny Ludlum Steel Corp. .. 2
Allied Products Corp. 104A
Alofs Mfg. Co. 139C
American Measuring Instrument Co. 143C, 144G
Ammco Tools, Inc. 50

Baker Brothers, Inc. 30
Balas Collet Co. 63
Barnes Co., W. O. 40
Barnes Drill Co. 47
Barrett-Cravens Co. 113B
Barth Stamping & Machine Works 105
Baumbauch Mfg. Co., E. A. ... 137D
Bay State Abrasive Products Co. 77
Benchmaster Mfg. Co. 34
Beverly Shear Mfg. Co. 142E
Black Drill Co. 3
Bokum Tool Co. 42
Brown & Sharpe Mfg. Co. 71
Bryant Machinery & Engrg. Co. 15
Bub & Son, George F. 136A
Bunell Machine & Tool Co. 44

Carboloy Co. 86
Carpenter Steel Co. 81
Challenge Machinery Corp. 85
Chapin Co., Chas. E. 69
Chicago Mfg. & Distributing Co. 7
Cincinnati Shaper Co. 8, 144K
Cleereman Machine Tool Co. ... 15
Cleveland Universal Jig Co. 144L
Colonial Bushings Co. 141C
Columbia Tool Steel Co. 136C
Conant Tool & Engrg. Co. 137A
Conrad & Moser 144H
Continental Tool Works, Div. of Ex-Cell-O Corp. 78
Cullman Wheel Co. 148

Danly Machine Specialties, Inc. 27
Dahlstrom Mfg. Co. 140B
Davis Tool & Engrg. Co. 144D
Denison Engrg. Co. 26
Denning Mfg. Co. 144M
Detroit Die Set Corp. 45
Detroit Power Screwdriver 123B
Detroit Stamping Co. 101
Di Machine Corp. 37
Diamond Tool Co. 97
Dickerman Mfg. Co., H. E. 16
Die Supply Co. 131B
Dreis & Krump Mfg. Co. 144A
Dremel Mfg. Co. 31B
Dresel-Betz Co. 144B
Dumore Co. 35
Dykem Co., The 143D

Economy Engrg. Co. 46
Enterprise Machine Parts Corp. 93

Fakes & Co., Joseph B. 145D
Federal Products Corp. 14
Federal Tool Corp. 115B, 129B
Federal Tool & Mfg. Co. 106
Force & Co., William A. 94
Ford Motor Co., Johansson Div. 29

General Die & Tool Co. 144N
Gorton Machine Co., George ... 17
Gray-Mills Corp. 136D
Grinders & Fixtures, Inc. 133C
Grobet File Co. of America 6

HPL Mfg. Co. 129A
Hamilton Tool Co. 65, 92
Hammond Machinery Builders, Inc. 49
Harig Mfg. Corp. 67
Haskins Co., R. G. 135A
Heimann Mfg. Co. 143E
Hoggson & Pettis Mfg. Co. 121B
Holo-Krome Screw Corp. 5
Hovis Screwlock Co. 36
Huebner Publications 31A, 76

Illinois Tool Works 124B
Industrial Machine Co. 144P
Ingersoll Milling Machine Co... 23

J & S Tool Co. 104B
Johnson Gas Appliance Co. 111B
Johnston & Jennings Co. 107A

Kankakee Design Co. 144C
Kempsmith Machine Co. 90
Keo Cutters 117A
Kiffer Tool & Die Co. 144R

Lafayette Tool & Supply Co. .. 145G
Lassy Tool Co. 139A
Leach Machinery Co., Inc., H... 41
Lee Co., K. O. 79
Lempco Products, Inc. 127A
Lester-Phoenix, Inc. 20
Lincoln Park Mfg. Co. 144E
Linderme Machine & Tool Co... 133D
Linley Brothers Co. 124A
Lucas & Son, Inc., J. L. 145E

M-B Products 137C
Metal Cutting Tools & Mfg. Co. 80
Michigan Chrome & Chemical Co. 139B
Modern Motor Drives Div. The Nichols Engrg. Co. 21
Monarch Machine Tool Co. 43
Moore Special Tool Co., Inc. 39, 111A

National Tool & Die Manufacturers Ass'n. (NTDMA) 75
Niagara Blower Co. 115A
Nicholson File Co. 13
Nielsen Tool & Die Co. 141B
Noble & Stanton, Inc. ...82, 88, 144S
Norton Company 18-19

Oliver Instrument Co. 117B
O'Neil-Irwin Mfg. Co. 28

Paramount Tool Co. 144T
Persson Mfg. Co. 123A
Phoenix Machine Co. 144W
Porst Brothers 138C
Pratt & Whitney Div., Niles-Bement-Pond Co. 11
Preis Engraving Machine Co., H. P. 137B
Putnam Tool Co. 1

R & L Tools 102
Racine Tool & Machine Co. 48
Rane Tool Co. 144J
Ray-Metal Co. 141A
Rice Pump & Machine Co., Div. Milwaukee Chaplet & Mfg. Co. 135B
Rogers Mfg. Co., Dayton 145B

Schaffer Co., S. S. 142C
Scherr Co., George 134B
Schraner & Co., A. P. 144X
Severance Tool Industries, Inc... 146B
Shore Instrument & Mfg. Co. .. 145A
South Bend Lathe Works 133A, 142A, 145H
Spiral Mfg. Corp. 107B
Spitfire Tools, Inc. 25
Stadoil Mfg. Co. 136B
Standard Machinery Co. 22
Standard Pressed Steel Co. 141D
Steel Products Engrg. Co. 131A
Strand & Co., N. A. 146A
Swedish Gage Co. of America .. 113A

Tamms Silica Co. 145C
Tannewitz Works 32
Thermo Electric Mfg. Co. 38
Timken Roller Bearing Co. 9
Tomkins-Johnson Co. 24
Twentieth Century Mfg. Co. 87

Ulmer Co., J. C. 142B
United Tool Service Corp. 25
Universal Engrg. Co. 119A
Universal Gear Works, Inc. 145F
U. S. Treasury Dept. 133B

Variety Machine & Stamping Co. 144Y
Victor Saw Works 84
Viking Tool & Machine Corp. .. 144Z

WLS Stamping Co. 121A
Wales-Strippit Corp. 103
Walker-Turner Co., Inc. 89
Walls Sales Corp. 140A
Warren-Knight Co. 143B
Watts Brothers Tool Works 143A
Webber Gage Co. 10
Welding Equipment & Supply Co. 91
Wells Mfg. Corp. 95
West Point Mfg. Co. 119B
Wheelock, Lovejoy & Co. 138B
Whistler & Sons, S. B. 12
Whitman & Barnes 147
Wilson, K. R. 33

Yost Mfg. Co. 142D

INFORM-A-GRAM KEY NUMBERS

Radial Drill For Compound Angle Boring

The problem of boring a series of holes at a compound angle has always been a difficult one; but the task is even greater when it must be done in a heavy, unwieldy base. This problem has been solved by a Michigan manufacturer in a new, ingenious and accurate way, which also cuts the time of performance in half. Faced with the task of boring twenty ½″ holes at a compound angle in a fabricated base measuring 42″ square and 8″ through and weighing 865 lbs., he mounted the base on a standard 24″ Rotab under a radial drill press. By selecting the radial drill for the purpose instead of the boring mill it is obvious that his choice was in favor of the less expensive type of equipment. He made the initial setup on the face plate and tilted the fixture to the proper angle, radially indexing the work for the various holes through the worm mechanism by reading the graduations on the vernier dial. The Rotab is a device manufactured by Machine Products Corporation.

For further information and details about the Rotab, write to Machine Products Corp., Dept. 144, 6767 McNichols Rd., Detroit, Mich., or circle Inform-A-Gram Key No. D34.

Write on your letterhead today for your free Victor wall chart and hang it near the tool crib or in your machine shop for ready reference. It's absolutely free.
USE the RIGHT BLADE for every job

NOW YOU SEE AT A GLANCE

- WHICH BLADE TO USE
- HOW BEST TO USE IT

Printed attractively in two colors this Victor chart tells at a glance exactly which hand, band, or power blade to use on *any* material. It gives money-saving, work-speeding suggestions on the proper use and care of blades.

Turn to your Victor supplier, too, for better-cutting, longer-lasting blades. He has a Victor blade for every job a hack saw or band saw can do—one that you can rely on to give you fast, clean cuts on metals, plastics and other non-metallics.

VICTOR SAW WORKS, INC.
MIDDLETOWN, N. Y., U. S. A.
3375
Makers of Hand and Power Hack Saw Blades, Frames and Band Saw Blades

(CONTINUED FROM PAGE 74)

a grinding machine that was developed originally by the makers for grinding engraving cutters. The spindle has a vertical movement of ½ inch effected by means of a nut graduated to represent each 0.001 inch of spindle feed.

The makers of the "Centerfinder" point out that the conventional type of scriber blade, Figure 3, fitted to a vernier height gauge is not conducive to accurate centering at the intersection of marked-out center lines. It is beveled on the top face only, so that the true center is in a corner of the intersection, Figure 3A. However, by using a scribing blade that is beveled top and bottom, the center is truly in the center of the intersection, Figure 3B. A scribing blade having a double bevel and capable of fitting a height gauge is supplied by the makers; it is accurately made so that the scribing edge can be set at precise heights.

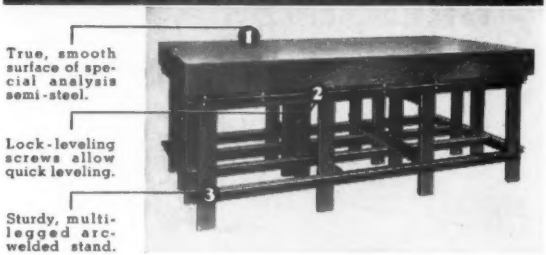
When the work is to be marked out, the surface plate base of the "Centerfinder" can be used, and to facilitate this the head and its supporting bracket can be swung round the column through 180 degrees, to leave free the major part of the surface plate.

★ ★ ★

Monarch Representative Sails For Europe

Paul Hawkins, a member of the home office sales force of The Monarch Machine Tool Company, Sidney, Ohio, sailed March 27 on the Queen Elizabeth to Europe where he will be on a special assignment for the Company for the next six months. One of the highlights of his trip will be a special showing of Monarch's new lathes in Brussels the first two weeks of April. The showing will be staged by S. A. Isbecque Todd. Hawkins will also be present at the Olympic Fair, held in London August 26 to September 11, where several Monarch machines will be exhibited. A native of Tiffin, Ohio, Hawkins has been associated with Monarch Machine Tool Company since 1939.

FOR REPEATED ASSEMBLIES AND ACCURATE LAYOUTS



CHALLENGE
LAYOUT SURFACE PLATES

- Built to "stand the gaff" of hard service. True, smooth surfaces of special analysis semi-steel with heavy, deep ribs to prevent sagging and yielding under load.
- Standard plates 6" thick, 8" plates on order. Sizes 12"x18" to 54"x144". Large units can be made up by grooving and keying several standard units.
- Sold with or without sturdy, multi-legged arc-welded steel stand with lock-leveling screws to allow quick leveling.

Write for Challenge Precision Equipment Catalog.
870

THE CHALLENGE MACHINERY CO.
GRAND HAVEN Challenge MICHIGAN

Useful Toolmaking Handbook Now In Revised Edition

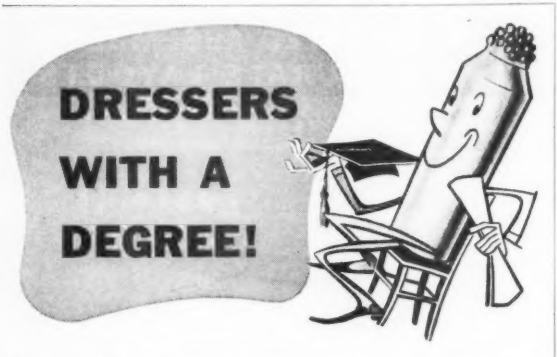
Between the covers of the revised "Tool Steel Simplified" handbook is practical, common-sense information which "begins at the beginning" and, step by step, simplifies the job of getting better, longer-lasting tools and dies. In clear, non-technical language, the 564 pages of "Tool Steel Simplified" comprehensively cover the latest developments in toolmaking and heat treating. In addition, a total of 355 illustrations, including diagrams, charts, photographs and tables, are used to clearly drive home each point.

This revised edition will help shop men in selecting the proper steel for each job, in simplifying heat treating, and in reducing tool failures. It will also help them show the company how to raise production from present equipment, reduce machine downtime, and hold unit costs in line. These gains, combined with becoming thoroughly familiar with new and improved steels and new types of heat treating methods and equipment, will help the shop man to "up-grade" his skill.

Skilled toolmakers will find new information on air-hardening steels, a new approach to hardenability (hardening penetration), new high-speed and hot work steels, and a useful alphabetical tool Steel Selector. Younger men in the trade will find "Tool Steel Simplified" takes them along to an understanding of tooling operations. Instructors and supervisors will also find "Tool Steel Simplified" a valuable aid in training new men.

Frank R. Palmer, vice-president of The Carpenter Steel Company, and George V. Luerssen, chief metallurgist of the company, are the authors of this valuable book. Mr. Palmer has a background of many years in the manufacture, use and heat treatment of tool steel.

"Tool Steel Simplified" by Palmer and Luerssen; 564 pages; $2.00; published by The Carpenter Steel Co., Reading, Pa.



Yes, Carboloy Diamond Dressers have a degree — a greater degree of usefulness than you've ever seen in any other dresser. Why? Because of their

"EDUCATED DIAMONDS"

They stand abuse . . . and *can't* come loose!

A matrix of Carboloy Cemented Carbide holds them fast for a longer, more useful life.

These small, *inexpensive* diamonds, firmly embedded in *the hardest metal made by man,* can save you up to 40% in dressing costs!

Don't let diamond loss and replacement eat into your profits any longer. Ask us for our free brochure, DR-480, "More Profitable Use of Diamonds for Dressing Grinding Wheels." There's no obligation. *Carboloy Co., Inc., 11111 E. 8 Mile Blvd., Detroit 32, Michigan.*

DIAMOND DRESSERS

by CARBOLOY ®

Dielectric Heating in The Plastics Industry

"Dielectric Heating—Its Operations and Applications in the Plastics Industry", is a manual designed for ready-reference use by men actively engaged in the high production molding of plastics. It takes the subject from its inception as a production technique and develops it fundamentally and comprehensively. Temperature Measurement; Molding Procedures; Computing Time; Generator Requirements for Given Materials; Applications and New Horizons; Cost Analysis; Equipment Commercially Available; Advantages of Dielectric Preheating—all these subjects are discussed basically and thoroughly.

Added features of particular interest are an "Electronic Power Heating Chart", which contains 16 scales and 4 tables useful in the computing of time and power requirements for given dielectric materials. Priced at 50 cents, copies are available from Huebner Publications, 1975 Lee Rd., Cleveland 18, Ohio.

★ ★ ★

Reltool Appoints Winfrey to Sales In New England

The Reltool Corporation of Milwaukee, Wisconsin, recently announced the appointment of the Walter E. Winfrey Company, Cambridge, Massachusetts, as its sales representative in Eastern Massachusetts, Rhode Island, New Hampshire and Maine. The Winfrey Company will represent the complete line of Reltool Metal Cutting Tools, which includes Center Drills, Circular Saws, Cut-off Blades, End Mills, End Mill Holders, Keyseat Cutters, Milling Cutters, Lathe Mandrels, Stub Arbors, Equalizing and Driving Collars, as well as special saws for plastics and soft, tenacious metals.

Only SUPERBORE GIVES YOU Each COUNTERBORE AND DRILL IN 3-SIZES TO DO THE JOB.. Right!

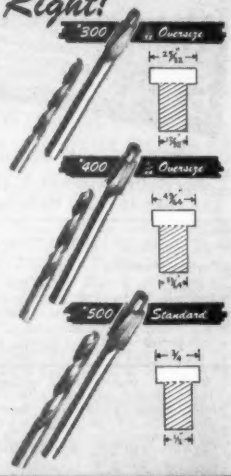
▼ Finest High Speed Steel
▼ Smooth, Fast, Free-Cutting Operation
▼ No Clogging or Freezing of Chips
▼ Heat-Treated and Precision Machined Throughout

When you tackle that production problem . . . remember there's only one right answer. SuperBore drills and counterbores provide that answer every time because they give you the advantage of oversizes . . . the shade of size difference that means **perfect** results. SuperBore drills and counterbores come in a set consisting of standard sizes* or oversizes above the standard dimensions.

SuperBore products are made of supertough fine-grade high speed steel. Fore and aft precision grinding of flutes and pilot allow chips to flow out freely. As in the case of reamers, flutes are backed-off to width of land to prevent heat generation, clogging, or freezing.

All 3 8", 7/16", and 1/2" drills and counterbores have shank of 1/2" diameter to fit that size drill chucks or collets.

Write for Prices and Literature.



TWENTIETH CENTURY MANUFACTURING CO.
3720 MONTROSE AVENUE CHICAGO 18, ILLINOIS

Boring, Drilling, Milling Machines Handbook

Every person interested in obtaining practical, understandable information about the modern horizontal boring machine, and its versatility in performing standard and specialized work, should possess a copy of the new "Handbook for Horizontal Boring, Drilling and Milling Machines and Their Applications".

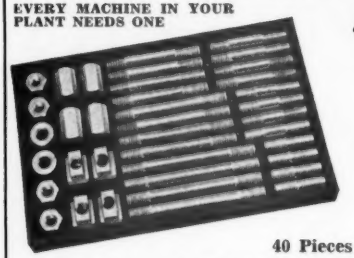
In the 266 pages comprising this work, more than 325 illustrations, drawings, charts, diagrams and tables aid the reader in visualizing the practical information presented. The "Handbook" is based primarily upon horizontal boring machine procedures; however, many of the machining concepts described may be equally applicable to other tools.

Thirty chapters, offering greater detail about machining than is the customary practice in books of this description, are arranged in three convenient sections, namely, Machine Fundamentals, Basic Operations, and Work Methods. A feature presented for the first time, perhaps in any book, treats boring feeds and speeds in detail.

"Handbook for Horizontal Boring, Drilling and Milling Machines and Their Applications" is published by Giddings & Lewis Machine Tool Co., Information Service Dept., Fond du Lac, Wis. 266 pages, $5.00.

Get Set for Quick Set-Up!
Handy STUD AND NUT SET

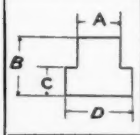
EVERY MACHINE IN YOUR PLANT NEEDS ONE



Saves You
Machine Hours
Man Hours
★
Cuts Costs and Pays for Itself

40 Pieces in Each Set
All Sets in Individual Cases

Specially designed T-slot nut will prevent damage to table slots caused by ordinary nuts.



Holes & Thread	A	B	C	D
½"—13 THD.	.555	¾"	11/32"	⅜"
⅝"—11 THD.	.675	1⅛"	15/32"	1⅛"
¾"—10 THD.	.800	1⅜"	½"	1⅜"

Made of Quality Steel. Case Hardened and Chrome-Plated for Long Life. Class 3 Threads.
Sets Sized to Provide Greater Rigidity in Clamping.

Prices
½" Set, $22.00
⅝" Set, $24.00
¾" Set, $26.00

Order Today! Immediate Delivery!

NOBLE & STANTON, INC.
Manufacturers of Tools, Gages and Their Accessories
1002 BROADWAY • BEDFORD, OHIO
NS

Materials Weight Tables

Materials Weight Tables, calculated and compiled by George H. Thompson, former treasurer of the Cleveland Metal Stamping Company, have been published in book form by Huebner Publications. In practical, everyday use for many years, they reduce to a minimum the work of calculating the total weight of steel required for a press run. The basis factor of 1 cubic inch of steel=.2836 lbs. is used throughout and the tables are readily converted for use with all other metals as well as non-metal materials.

Mr. Thompson's initial calculations involved working the formula—"length × width × .2836, 36,764 times in covering the sizes from 1/16"×1/16" to 12" ×12" in steps of 1/16".

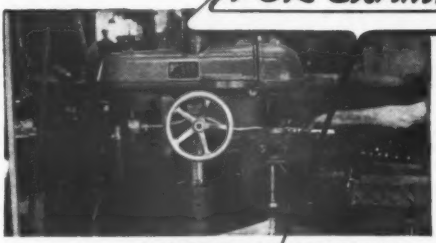
The estimator will readily recognize the great saving of time these tables insure whether worked entirely "by hand" or with a slide rule. It is appreciably faster to multiply a given constant arithmetically by the stock thickness than to carry through slide rule settings of "length × width × thickness × weight." This book is for sale at $2.00 a copy and may be obtained by sending to Huebner Publications, 1975 Lee Rd., Cleveland 18, Ohio.

★ ★ ★

SPE Professional Grade Membership

The Executive Committee of the Society of Plastics Engineers has established a Professional Grade Membership predicated on 10 years of qualifying experience in the plastics industry. This is a move to maintain high standards of membership. An applicant having a Ph.D. in science or engineering will be allowed seven years' credit and will therefore need only three additional years of qualifying experience to be eligible for a Professional Grade Membership. Similarly, candidates with an M.S. or B.S. degree will be credited with six and four years, respectively. A bachelor's degree from a non-technical college rates a two-year experience credit.

FOR EXAMPLE



HINES FLASK COMPANY
SOLVES GRINDING AND DRILLING PROBLEM

INCREASES PRODUCTION 500%
WITH WALKER-TURNER 20" DRILL HEADS

Air-chipping sprues from aluminum castings retarded production . . . drilling corner holes with vertical presses caused inaccuracies at Hines Flask Co. of Cleveland.

Walker-Turner 20" Drill Heads solved *both* problems. Equipped with abrasive wheels, they ground down sprues in minimum time—*production soared 500%.* Operated horizontally in Hines' work holding set-up, they drilled holes at accurate angles—*production increase, 100%.*

Handling unusual requirements or routine operations, Walker-Turner Machine Tools pay for themselves within a few weeks. *For complete catalog, write to Walker-Turner Company, Inc., Plainfield, N.J.*

In this Hines' set-up 20" Drill Press grinds surfaces of aluminum flasks in radial motion. 20" Drill Heads have 6" spindle travel. Capacity: cast iron —1"; steel—¾". Price: less motor and column, Model D-1101X, Power Feed —$216.00; D-1100X, Hand Feed—$135.00.

walker-turner MACHINE TOOLS

SOLD ONLY BY AUTHORIZED INDUSTRIAL MACHINERY DISTRIBUTORS

DRILL PRESSES - HAND AND POWER FEED • RADIAL DRILLS
RADIAL SAWS • BAND SAWS - FOR WOOD OR METAL
RADIAL METAL CUT OFF MACHINES • MOTORS

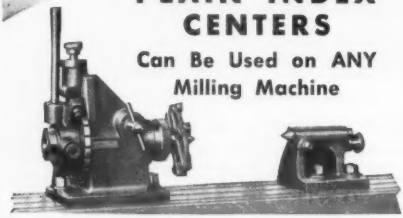
Practical Quality Control

Articles and case histories by top-flight authorities on Quality Control have been compiled and published by Huebner Publications. As Contributing Editor of TOOL & DIE JOURNAL, where these articles and case histories originally appeared, A. H. Ehlers stresses that real education comes from practical experience in the shop—the real feel of a subject is not acquired from a textbook—but from the actual "doing". This collection of articles explains and shows the "how-to-do" of Practical Quality Control. Included in the book are the following articles: A Complete Quality Control Program by Joseph Manuele, Director of Quality Control at Westinghouse Electric Corporation; Quality Control of Steering Gear Parts, from a Federal Products Corporation Quality Control Conference; Quality Control of Automotive Valve Line Production, by E. F. Gibian, Chief Industrial Engineer of Thompson Products, Inc.; Demonstrating and Reporting Quality Control, by Martin A. Brumbaugh, University of Buffalo; Shop Talk on Quality Control, by A. H. Ehlers. Priced at $1.00, copies are available from Huebner Publications, 1975 Lee Rd., Cleveland 18, Ohio.

CUT MILLING COSTS with KEMPSMITH STANDARD ATTACHMENTS

PLAIN INDEX CENTERS

Can Be Used on ANY Milling Machine



KEMPSMITH ARBORS in all popular sizes or types. Adaptable to ANY make of milling machine with standardized spindle.

Kempsmith Plain Index Centers for production and general indexing . . . simplify job set-ups . . . relieve the operator of the necessity of counting or making any calculations. Indispensable in milling taps, reamers, small gears, sprocket wheels, special grooving, etc. Described in Bulletin No. 124.

Kempsmith Standard Attachments **broaden the scope of your milling machine . . . lower capital investment . . . save in set-up time.**

KEMPSMITH MACHINE CO.
1829 SOUTH 71st STREET
MILWAUKEE 14, WIS., U.S.A.

KEMPSMITH

Precision Built Milling Machines Since 1888

★ ★ ★

Rim Production Cost Reduced

Through the use of a standard flash welder produced by Progressive Welder Company of Detroit, Michigan, a lower cost method of fabricating steel rims for tricycle wheels has been developed by the LaPorte Corporation of LaPorte, Indiana. Use of a motor operated flash welder has enabled the company to produce 480 rims per machine-hour as compared with roughly 120 per hour if the conventional method of arc welding were used. Because of employing flash welding for the operation, relatively unskilled operators can be used—another cost-reducing factor. In addition, more consistent weld quality is accomplished by the use of this method. The entire operation is automatic and is controlled by the operator from one position.

PLEASE USE INFORM-A-GRAM FOR PRODUCT INFORMATION

Plating and Films of Tungsten and Tungsten Carbide

A most interesting and significant new process that multiplies many times the industrial applications of tungsten and tungsten carbide has been developed in the laboratories of the Ray-Metal Company, carbide tool specialists, of Walled Lake, Michigan. As disclosed by Dr. Raymond Nauth, General Manager, the development has two end results.

The first is the plating of objects or controlled areas with tungsten. When this is done with tungsten plus 4% cobalt the deposited plate has an electrical conductivity comparable to that of silver. Consequently, this phase of the process is creating a lot of interest in the field of "printed circuits" on plastics, ceramics and other non-conductors for hearing aids, radios and other miniature electronic assemblies.

The second is the conversion of a film of tungsten plate to tungsten carbide. This is giving rise to many wear-resistance applications. Machine and instrument parts, cams, levers, slides, bearings and comparable wear-parts may be protected by a film of tungsten carbide hardness that increases the service life of such parts by many times.

In addition to his work with carbides, Dr. Nauth is author of the widely-used book, "The Chemistry and Technology of Plastics."

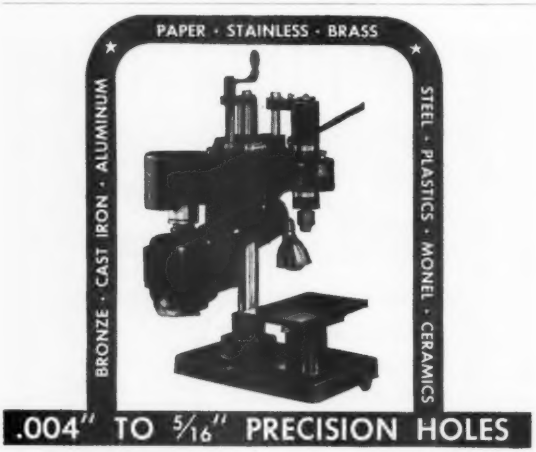
Two other products of the Ray-Metal Company are "Hi-Rockwell" drills and solid carbide drills. The "Hi-Rockwell" drill is tungsten-carbide tipped and will cut into oil-hardened steel without annealing the stock as it drills. It reduces the cost of drilling a "forgotten" hole in an expensive, hardened die, fixture or mold.

Ray-Metal solid carbide drills offer extreme toughness and resistance to wear. They are ground from the solid, with highly polished flutes, and are designed for high production drilling of ferrous and non-ferrous metals, plastics, and other non-metallic materials. For detailed information circle Inform-A-Gram Key No. D32.

ANNOUNCING!
Eureka 100% PURE NICKEL
WELDING ELECTRODES
PRODUCE MACHINABLE WELDS ON CAST IRON WITH 100% PURE NICKEL DEPOSITS
1 Have insulation coatings, preventing side-arcing.
2 Smooth spatter-free arc action, AC-DC.
3 Emit no injurious gases.
4 Produce smooth bead contours with excellent slag coverage.
5 Give soft, ductile, homogeneous and porous-free weld deposits.
Write for Literature
You Be the Judge
ORDER A 5-LB. PACKAGE Today!
WELDING EQUIPMENT & SUPPLY CO.
225 LEIB STREET • DETROIT 7, MICHIGAN

New Aluminum Sheet Announced by Reynolds

After many months of experimental work, the Reynolds Metals Company of Louisville, Kentucky, is now producing a new form of aluminum sheet—embossed. The embossing is done right at Reynolds' mill and includes such patterns as squares, diamonds, stucco, and simulated grained leather, as well as ribs crosswise and ribs lengthwise. The embossed pattern is extremely important because it makes the surface so attractive that additional surface finishing is unnecessary and therefore provides a partially fabricated product at a very low cost. The patterns effectively hide scratches and other evidences of rough usage or wear, thus prolonging the life of products made of this embossed aluminum. All of the patterns can be supplied in flat sheet in thicknesses ranging from a minimum of .010" to a maximum of .040", and in widths from a minimum of 12" to a maximum of 48". The wide variety of patterns offered gives the user a selection wide enough to meet practically any requirements, and already it is proving its worth in automotive industrial and building applications.



IN *all* DRILLABLE MATERIALS

If your job is to drill small, precision holes in hostile material try the Hamilton Varimatic Drill. It's super-sensitive; and the speed is infinitely variable between 840 and 9300 R.P.M. Clearances and travel are ample for all work of medium size. 80% of present installations are repeat orders. The reason for this popularity is built into the machine. Our Bulletin V-47 "tells all". Write for it!

THE *Hamilton* TOOL COMPANY

SUPER SENSITIVE DRILLING MACHINES · TAPPING MACHINES · PORTELVATORS

832 SO. NINTH STREET · HAMILTON · OHIO · U · S · A

★ ★ ★

Anderson, Inc. In New Plant

Anderson, Inc., makers of small tools, jigs, and fixtures, have moved into a new, modern plant at 6603 Diversey Avenue in Chicago's west end. Mr. William Anderson, president of Anderson, Inc., came to this country from Sweden as a young man and after getting first-hand shop experience he established the Chicago Cutting Die Company with his brother, Mr. Frank Anderson, in 1923. This company prospered through the years until with the establishment of Anderson, Inc., and the building of a new plant, Mr. Anderson took over management of Anderson, Inc., while his brother, Frank, assumed management of the Chicago Cutting Die Company.

PLEASE USE INFORM-A-GRAM FOR PRODUCT INFORMATION

Two New R and L Tools

The R and L Tools Company of Philadelphia are announcing two new additions to their well known line of precision tools for screw machines. One of these is a cutting-off tool holder. The cutting-off tool holder is designed for use in the R and L Universal Tool Post and is built in three sizes for Brown and Sharpe Automatics. This holder is designed so that it can be used on either the front or rear cross-slide, with the spindle running forward or backward. It uses blades of special alloy high speed steel, and will also use solid full length Tungsten Carbide blades which can be furnished with it.

R and L's Universal Tool Post, for which these cutting-off tool holders were designed, will hold square or flat tools on either front or rear cross-slide.

The second new tool which R and L Tools are announcing is their Acorn Die Holder. This holder is designed with a large keyed ring washer which separates the cap and locknut and thereby facilitates any tightening and adjustments. For speedy, accurate and simplified adjustment of the die, the cap and locknut are provided with spanner wrench notches. The clutch mechanism is the same as used in R and L's well known Tap and Die Holder, and allows the holder to be released without shock. The Acorn Die Holders are carefully and skillfully made, and they are available in a wide variety of sizes. A list of these sizes may be obtained from the manufacturer—that is, their threading capacity, length of body, diameter and length of shank, etc. The R and L Tool Post and the Acorn Die Holder are the first of a series of new tools which R and L have scheduled to bring out within the next few months, in a new expansion program. Complete Details may be obtained from R and L Tools Co., Dept. 2, 1825, Bristol St., Philadelphia 40, Pa., or circle Inform-A-Gram Key No. D39.

Empco JACKS
Set and KEEP Your Machines LEVEL!
Saves set-up and re-leveling time
Self aligning on uneven floors
Accurate two-way adjustment
Machine Tool Manufacturers strongly emphasize the need, not only to set machines level, but to keep 'em that way. Periodic re-leveling is essential for accurate work tolerances. How often, depends on the type of foundation. No method of machine setting is stable enough to maintain the accuracy of initial leveling. It is important to check after first month of operation, then check periodically and re-level whenever necessary.
When a machine is set on EMPCO JACKS, the whole operation is the work of but a moment: Simply apply a wrench to the "hex" screw head, turn right or left until your level indicator reads "zero."
EMPCO
3 SIZES
No. 1—2" normal height
No. 2—2⅝" normal height
No. 3—3⅛" normal height
EMPCO
THE ENTERPRISE MACHINE PARTS CORPORATION
2733 JEROME AVE.
DETROIT 12, MICH.

SEE ADVERTISERS INDEX, PAGE 83, FOR KEY NUMBERS

ASTE Show Big Success; 1948-49 Officers

Plans for another giant industrial exposition to be sponsored by the American Society of Tool Engineers in March of 1950 were announced on the closing day of the highly successful Tool Engineers' Industrial Exposition in Cleveland's Public Auditorium March 15-19. It is probable that the 1950 show will also be held in Cleveland. The 1948 show was a tremendous success and broke all previous records both for attendance and general excellence. A gate count of 63,524 showed that the 22,427 registrants visited the exposition not just once but several times during the five-day period. There were many more exhibitors this year than in 1946—336 manufacturers of industrial equipment and vendor of allied services. A large number of foreign countries were represented, including England, France, Sweden, Switzerland, Belgium, Denmark, India, Chile, Argentina, and several other South American countries. Also present was an official delegation of 18 members of the British Gauge and Tool Makers' Association who spent three days at the show.

for PRODUCTION-LINE MARKING

The FORCE
CONVEYOR MARKING ATTACHMENT

Imprint products or containers while they are still on the conveyor without a second's slowing of production. This dependable marking unit attaches to your conveyor, taking its operating power from the chain. It is fully automatic, self-inking, and uses the famous FORCE Base-Lock Rubber Type which permits instant changing of marking code.

Send for further information today, or mail us your specifications and we will design a special unit for you.

The FORCE Will Do It
OF NUMBERS

WM. A. FORCE & COMPANY
INCORPORATED
216 NICHOLS AVENUE, BROOKLYN 8, NEW YORK, U.S.A.

During this Sixteenth Annual Meeting, the 1948-49 officers of the American Society of Tool Engineers were elected. Irwin F. Holland was named president. Mr. Holland is with Pratt & Whitney, Hartford, Conn., where he is general superintendent of the Small Tool and Gage Division. Mr. R. B. Douglas, president of Godscroft Industries, Ltd., of Montreal, Canada, was elected first vice-president. Mr. H. L. Tigges, vice-president of Baker Bros., Inc., of Toledo, Ohio, was elected to the second vice-presidency, and Mr. V. H. Ericson, vice-president of Johnson de Vou, Inc., Worcester, Mass., was elected to the third vice-presidency; Mr. George A. Goodwin and Mr. William B. McClellan, treasurer and secretary, respectively.

Timken Leases New Plant

Soon after May first of this year, The Timken Roller Bearing Company will concentrate all its Zanesville, Ohio, operations in one manufacturing plant at 2300 Linden Avenue, Zanesville, Ohio. Timken came to Zanesville in October, 1943, as an emergency wartime measure to relieve the heavy work burden caused by labor shortages at their main and largest plants in Canton and Columbus. At that time they established three small finishing plants where grinding, assembling, inspection, packing, and shipping of bearings and bearing parts were done. The concentration of these three plants into one will enable Timken to combine and simplify operations and save considerable floor space according to Mr. A. M. Donze, vice president in charge of manufacturing. No important work stoppage is anticipated because of the move since the move will be made gradually to minimize layoffs. The future Timken plant was secured on a five-year lease with the option of five consecutive one-year renewals. The plant is occupied at present by its owners, The Shawnee Pottery Company.

★ ★ ★

Increase in Use of Resistance Welding

The use of resistance welding for the fabrication of all kinds of metal products has grown at such a tremendous rate since the war that during 1947 deliveries of resistance welding equipment to industry were over 5 times the annual shipments during the 1938-39 pre-war period, according to Resistance Welder Manufacturers' Association. R.W.M.A.'s president, Mr. T. S. Long, explains that during the war, industry was faced with the necessity of turning out vast quantities of fabricated metal assemblies of all kinds at a high production rate—the answer being resistance welding. Today in almost every industry, resistance welding is used—either to boost production, cut cost, or to improve product quality.

TWO First Metal Cutting Saws
FOR PRODUCTION AND
GENERAL UTILITY
WELLS No. 8
with wet cutting system
Here's a saw that will pay dividends on practically any cut-off job. It's fast, versatile and economical. The wet cutting system illustrated is a low cost extra that makes possible higher cutting speeds and longer blade life. Capacity: 8" x 16", rectangular; 8" O. D., rounds.
WELLS No. 12
with automatic cutting cycle
The new Wells No. 12 is an electrically powered, hydraulically controlled saw. Just push a button and the head comes down and makes the cut at a controlled blade pressure. At the completion of the cut the head returns to a predetermined position and the motors shut off. Capacity: 12" x 16", rectangular; 12¾" O. D., rounds.
Wells saws
Wells
Products by Wells are Practical
METAL CUTTING
BAND SAWS
WELLS MANUFACTURING CORPORATION
1940 CEDAR ST., THREE RIVERS, MICHIGAN

SEE ADVERTISERS INDEX, PAGE 83, FOR KEY NUMBERS

Tooling and Production
Apex Fold-A-Matic Ironer

(CONTINUED FROM PAGE 64)

to contact the milled surface (G). This brings the lower face of the gage pin (C) in contact with spot faced surface of universal coupling shaft boss (F).

Inasmuch as the tolerance on this dimension is .005", the top surface of the gage pin (C) must rest between the stepped surfaces (D) of the gage plate in order to come within the specified limits. If the gage pin top extends above the gage plate upper stepped surface (D), it indicates that not enough material has been removed in the milling, but if it falls below the lower surface it indicates too much material has been removed.

Front Face Drilling and Reaming Operations

Two cored holes cast in the front face of the gear case (C and D), Figure 26, through which the press control and speed control shafts pass, are finished by reaming and counterboring. A half moon boss (Y), cast on the gear compartment floor, located $1\frac{3}{16}$" from the front face and on the center line of the speed control shaft passing through hole (C), is reamed and serves as a support for the speed control shaft.

Another boss cast on the floor of the gear compartment, 3" from the front face and on the center line of the worm shaft passing through hole (B), Figure 11, has to be drilled. Because of its location this boss could not be cored when cast, therefore it has to be drilled in preparation for a later boring operation. Two holes (H), Figure 27, have to be drilled and tapped. A seal retaining plate is attached to the gear case by two No. 10-24 screws inserted in these holes.

It was originally planned to perform all of these operations with one loading of the gear case in the drill jig. However, it was found that the time consumed in performing the different drilling and reaming operations was excessive and caused a bottleneck in the gear case production. By breaking up the operations into two groups and building two sets of fixtures, time was saved and production increased by performing the operations with two operators.

The jigs developed for these operations are box shaped with four closed sides, no bottom, and one end open through which the case is loaded and clamped in place.

To better illustrate these jigs, two views are shown in Figures 26 and 27. Figure 26 is the rear view while Figure 27 is the front view. For descriptive purposes, the first jig developed by Apex is described. This was constructed of aluminum plate, Figure 26, and when this jig proved itself, an aluminum casting of the box was developed for purposes of lightness, Figure 27.

Elements common to both jigs are: top (J); ends (K); sides (L); steel feet (M); gate (N); large clamp and screw (P); clamp support (Q); small clamp and screw (R); and a quarter-turn thumb screw (T).

The box portion of the jig is either bolted together as shown in Figure 26 or cast as shown in Figure 27. Four jig buttons (X) and two locating pins (Z) are positioned in the end member (K), Figure 26, so that the four corners of the bottom face of the case contact them when the case is set in the jig over the locating pins.

A gate (N), Figure 27, is designed to swing open for loading and unloading the case. A bushing plate (O), Figure 26, bolted to the gate, is positioned so that it swings under the half moon shaped boss when the gate is closed. A ball bearing, set in a counterbored hole in the bushing plate, serves as a guide for the step reamer. It is obvious that reaming the half moon shaped boss (Y) could not be accomplished without some means of holding the reamer in line; therefore the step reamer is designed with a 1" long pilot which enters the ball bearing guide before the reamer blades start cutting.

The gate, which is $2\frac{1}{2}$" wide, 1" thick by $9\frac{1}{8}$" long, also has a cavity (U), Figures 26 and 27, $\frac{3}{4}$" wide, $\frac{1}{2}$" deep by $5\frac{1}{2}$" long into which a clamping bar

(P_1) nests. A thumb screw (P), whose shank is peened into the clamping bar at assembly, actuates the clamping bar from its nesting position to the two outer edges of the gear case top face for clamping the case in the jig.

A steel clamp support (Q), bolted to the top of the jig, carries a screw (R), peened into a small clamping bar (W). This bar serves to square the case in the jig in addition to its clamping action.

Four steel feet (M) are bolted to the four corners of the aluminum jig to prevent undue wear of the aluminum as the jig is slid around on the drill press table.

Loading a gear case starts with the jig up-ended on surface (K), Figure 26, and with the gate open. The case is set on the two locating pins (Z) and rests on the four jig buttons (X). The small clamp bar is run in by the screw (R), Figure 27, which squares and clamps the case in the jig. Gate (N) is then closed and secured in place by turning the quarter-turn thumb screw (T). Final clamping is accomplished by tightening thumb screw (P), which runs the clamp bar (P_1) against the top face of the case, holding the case securely in place.

The case is now loaded for step reaming hole (C), and the half moon shaped boss (Y), Figure 26, and straight reaming hole (D) with the reamers set up in a six-spindle drill press.

The difference between the jigs shown in Figures 26 and 27 is in the drill jig plate (O) and (O_1) and jig bushings installed in the top plate (J). (O_1) is attached to the gate in Figure 27, the same as (O) in Figure 26; however, it has a drill jig bushing installed in line with the center line of hole (B), and above the boss (Y) to be rough drilled.

The procedure of loading this jig is the same as that described above, and the operations performed by one pass of the drill press spindle are those of drilling two No. 25 holes (H) and rough drilling a $\frac{3}{4}$" dia. hole through the inside boss (Y).

(TO BE CONTINUED)

RESETTING SERVICE

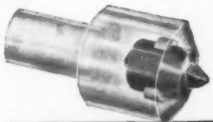
Industrial Diamonds
Dressing Tools

Conversion Charge Other Tools to Loc-Key-Set
$2.00 each

DT Co. Loc-Key-Set Diamond "Re-Set-Able" Dressers
Resetting Charge
$1.00 each
Return Post Paid U. S. A.

New Diamonds — 3 Grades
$12.00 per Karat
$24.00 per Karat
$48.00 per Karat
Sizes 1 to 10 Karat
Loc-Key-Set Re-Set-Able

We now service 3000 plants



DIAMOND TOOL CO., Not Inc.
938 E. 41st Street CHICAGO, ILL.

Sheldon M. Booth, Pres.
Phones AT5-1094 - 1095

Wales Sheet Metal Fabricator

for

Punching **Notching**

Nibbling **Bending**

Forming **Blanking**

Sheet metal product designers and producers will find much of great interest in the new, patented, Wales Sheet Metal Fabricator recently announced by George F. Wales, president of the Wales-Strippit Corporation, manufacturers of specialized punching and notching equipment. The versatility and flexibility of the Wales Fabricator are such that it readily performs punching, notching, nibbling, bending, forming and blanking operations.

This new fabricating machine is a logical result of the many years of experience that Wales-Strippit has had in the metal-working field, and since the application for patent, seven years ago, its development has been constantly under way. Several presses, clutches and various arrangements have been designed, tested, built and improved upon.

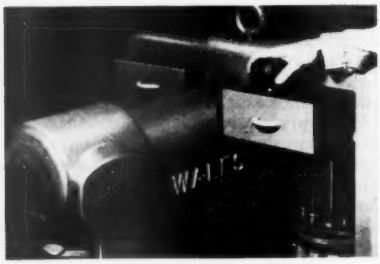
The present machine has been under continuous tests for two years and has operated in excess of 4,000,000 strokes under a 20-ton load.

Its frame, a one-piece steel casting, is correctly engineered to provide maximum rigidity, vertically, horizontally and torsionally. The full-floating drive shaft construction places the ram load, by means of main bearing, directly on the frame proper, thus eliminating any bending stresses on the drive shaft. The flywheel runs on a frame bearing thereby imposing no load on the drive shaft.

The tooling technique around which the Fabricator is designed, and by which it performs its many operations, in-

Fig. 1 (left). The one-piece, cast steel Fabricator frame insures maximum rigidity; the generous press table area accommodates work-in-process with a minimum of handling; the extendible foot control allows great latitude in operating position.

Fig. 2 (below). The Fabricator has "tool crib" accommodations for a generous assortment of press tools.



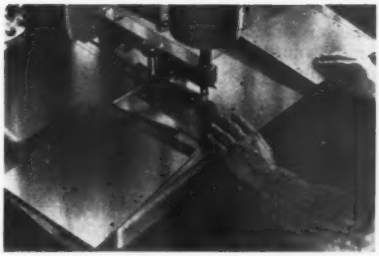


Fig. 3 (right). A setup of a Wales, type NG, notching unit mounted in the Fabricator for corner notching operations preliminary to forming the blanks into boxes.

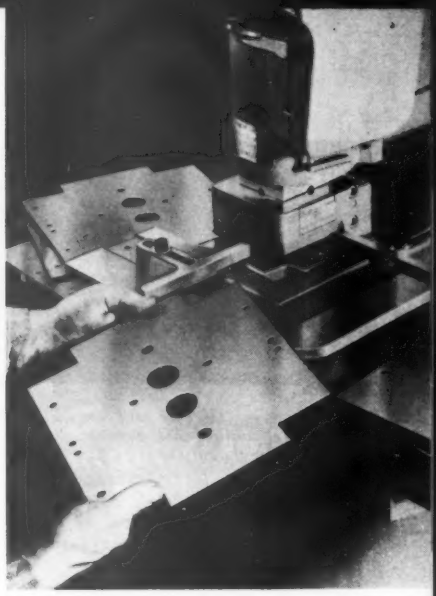


Fig. 4 (above). Showing the Fabricator tooled for a punching operation and the convenient work positions of both sides of the ram.

volves the familiar Wales self-contained punching and notching units. A patented, self-contained holder is provided which slides on ways in the press bed. The various round and shaped punches and dies are instantly interchangeable in the holder. This provides a quick change punch and die system of the greatest simplicity and versatility.

The ease with which punches and dies can be interchanged means that establishing the proper die clearance for the gauge of material to be punched is simply a matter of inserting a die having the proper clearance in relation to the punch.

Three dies, offering a choice of three different clearances, are provided for each punch. This selectivity permits clean-cut hole punching in various materials up to $\frac{3}{16}$" in thickness and is an outstanding feature in that all subsequent burring operations may be eliminated with the Wales quick change system.

The Wales Fabricator is specially designed with a $5\frac{13}{16}$" opening under the ram to permit using standard Wales, type "BL", hole punching units and their type "NA" notching units. Additionally, the standard Wales sliding filler plates are interchangeable with the sliding holder, mentioned above as used in the Fabricator quick change system. Tapped hold-down holes and pilot pins are located in the sliding filler plates for mounting the standard punching and notching units. Consequently, change-overs in setups for different operations may, in many cases, be accomplished in a few seconds.

In the over-all design and engineering of the Wales Fabricator everything has been taken into consideration for efficient operation. The wide, unobstructed bed table is at the correct height for easy feeding of large sheets as well as for permitting the operator to sit down while feeding small pieces. Slugs are directed to out-of-the-way containers through a tube of adequate clearance in the lower left side of the press frame.

An outstanding feature of the Fabricator is its "Hydra-New-Matic" head which operates with a minimum of vibration and noise at 165 strokes per minute for single hole punching and for nibbling. The press idles so quietly that a pilot light had to be built into the head housing; this automatically lights when the control switch is turned on.

A non-repeat, feather-touch trip lever releases the ram instantaneously for the down stroke. This lever must be actuated for each cycle of the ram during single stroke operations. The nibble lever controls the non-repeat function for continuous, uninterrupted operation

Fig. 5. Showing the ease and simplicity of interchanging punches and dies for different hole diameters and clearances.

of the ram for nibbling. An anti-jam device in the head is released by simply backing off a screw to relieve the oil pressure.

Dual control of the ram is provided by an adjustable, foot-actuated trip mechanism for use when the operator requires both hands to feed the work or when manipulating large sheets make it difficult to reach the hand trip lever. The foot control, on an extension cable, may be located at any point within a distance of four feet from the base outlet.

Nibbling around guide plates or templates is practically an automatic operation on the Wales Fabricator by positioning the nibble lever to provide continuous and uninterrupted operation of the ram. A special extended and adjustable holder with a manual turning device is available to enable the work to be swung around a center point for nibbling out full circles, semi-circles and arcs.

The Fabricator has its own "built-in tool crib" inasmuch as complete sets of graduated punch and die assembles are carried on the two revolvable storage spindles within arm's reach of the operator. These punch and die sets are for punching round and shaped holes by means of the Wales patented quick change system.

This results in rapid retooling for punching a great variety of round and shaped holes; as much as ½" diameter in mild steel up to ⅛" in thickness. Punching holes in $\frac{3}{16}$" mild steel is made possible with the standard quick change punch assemblies by installing a ram adapter and positive stripper. Different kinds and thicknesses of material call for different die clearances for a given punch in order to eliminate burring, hence the three-tier revolving die holder dies of three different clearances for each punch. The number of dies may be more or less to suit any requirements.

The other feature that makes the Wales quick change system possible is the sliding holder in the bed. By sliding the holder forward, the snap fit die and the punch member are readily removable by hand. Punches and dies are secured in the holder just as simply and quickly. All that remains is to slide the holder back into position and a new setup is ready to start punching.

A great variety of bending, forming and blanking operations may be performed on the Wales Fabricator. For any such operations the manufacturer will design and produce the necessary dies.

Detailed information on the Fabricator and its many applications may be obtained by writing the Wales-Strippit Corporation, 355 Payne Ave., North Tonawanda, New York.

Fig. 6. A setup using Wales, type C, hole punching units in the Fabricator for punching holes up to $\frac{5}{16}$" diameter on close centers.

Fig. 7. Nibbling a circle from a flat sheet by means of a special holder and pivot.

Speed PRODUCTION WITH . . .

DE-STA-CO *Quality* TOGGLE CLAMPS

Your work-holding tools give fast, uniform clamping action—longer life—greater power—because De-Sta-Co's more than forty models give you *quality* features.

- Well-engineered designs, precision-tooled for uniformity.
- Reamed bearing holes for accurate fit, sensitive operation.
- Fool-proof, *positive* toggle action—no cams.
- Friction-relieving off-sets in handles and links.
- Cold drawn solid bars—forged portable clamp parts.

New portable and plunger clamps are coming—to meet your various work-holding needs. Write for illustrated catalog and name of stocking representative in your area.

DETROIT STAMPING COMPANY

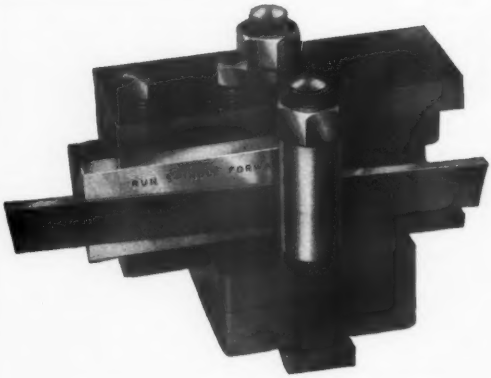
344 MIDLAND AVE. • DETROIT 3, MICH.

SEE ADVERTISERS INDEX, PAGE 83, FOR KEY NUMBERS

NEW

R and L Cutting-Off TOOL HOLDERS

Designed for use in the R and L Universal Tool Post. R and L Cutting-Off Tool Holders are built in three sizes for Brown and Sharpe Automatics for use on the front and rear cross-slide with the spindle running forward or backward. Uses blades of special alloy high speed. Solid full length Tungsten Carbide blades can also be furnished.



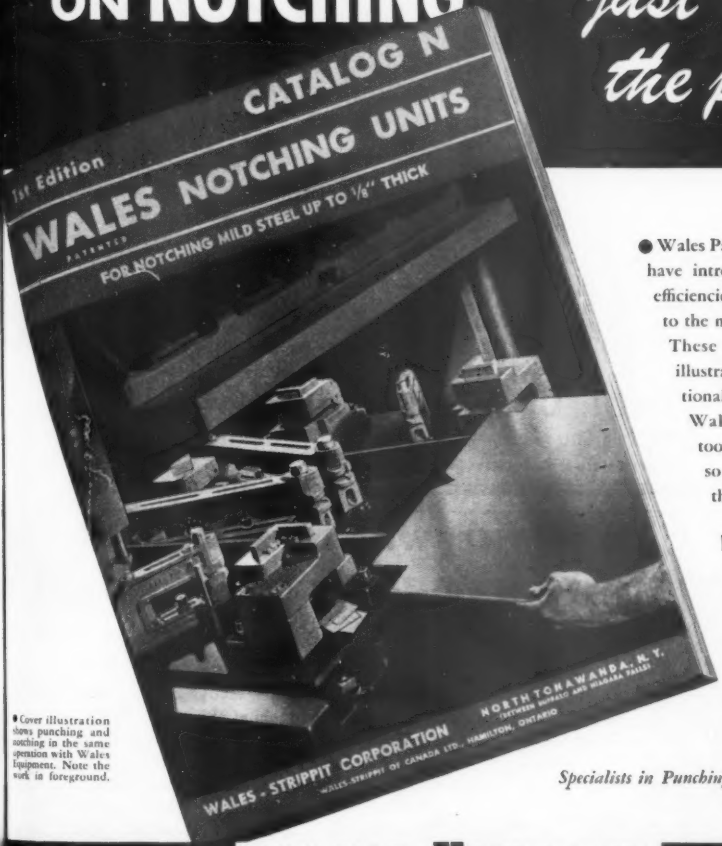
R and L Universal TOOL POST

Holds square or flat tools on front or rear cross-slide.

R and L TOOLS *1825 Bristol St., Philadelphia 40, Pa.*

WALES CATALOG ON NOTCHING

just off the press



● Cover illustration shows punching and notching in the same operation with Wales Equipment. Note the work in foreground.

● Wales Patented Notching Units have introduced economies and efficiencies never before available to the metal-working industry. These advantages are fully-illustrated in this new functionally-colored catalog. The Wales Equipment story is too big to tell on this page so write for your copy of this CATALOG N.

WALES-STRIPPIT CORPORATION
George F. Wales, President
355 PAYNE AVENUE,
N. TONAWANDA, N. Y.
(Between Buffalo and Niagara Falls)
WALES-STRIPPIT OF CANADA, LTD.
HAMILTON, ONTARIO

Specialists in Punching and Notching Equipme

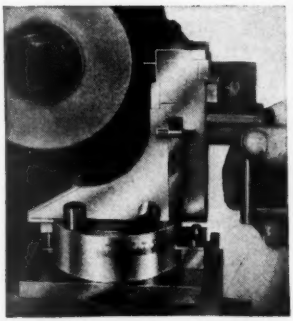
Wales Notching Units Set Up on Template in Stamping Press

"Strip" Template Setup of Wales Notching Units in Press Brake

★ ★ ★ *Fluidmotion**

Simplest and most accurate method of **FORM-DRESSING!**

● "Fluidmotion" Wheel Dressers generate wheel profiles in such a way that angles and radii flow into each other without sharp changes of direction. Two angles and a radius can be dressed in one continuous motion—after only one setting of the dresser. "Fluidmotion" Dressers are made of the finest chromium-molybdenum-vanadium alloy steels and have no wearing surfaces as the gibs and V ways are positioning surfaces only and the dresser swivels on completely dust-protected ball bearings. Several models available. Model F, illustrated, is the smallest. 5" height to diamond center, dresses wheels up to 7" in diameter, profile radius up to 2". Write for booklet.



*Reg. U.S. Pat. Off.

J&S **TOOL CO., INC.**

481 Main St. E. Orange, N. J.

Representatives in Principal Cities

GET THE WHOLE STORY OF

SERVICE WITH A *Punch!*

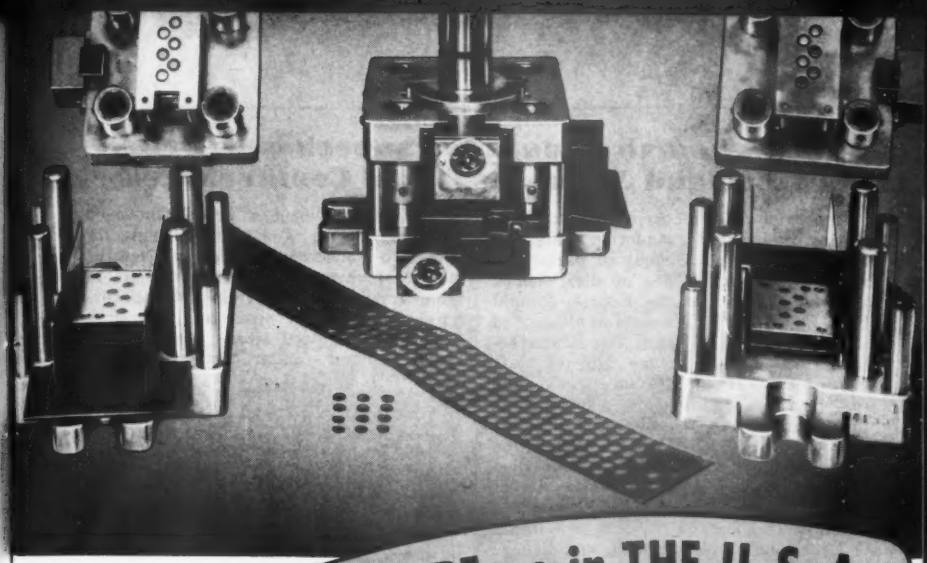
Allied's 48-page R-B catalog contains complete data and prices on R-B Interchangeable Punches and Dies—recognized and used for accurate, trouble-free punching throughout the metal-working and plastics industries. But that is only part of the R-B story. Also included in this catalog is full information on Allied's "one stop service" which includes retainers, composite die sections, rubber strippers, guide pins and bushings, and miscellaneous die makers' supplies. A copy is available to you without charge or obligation.

Write for it today.

ALLIED PRODUCTS CORPORATION

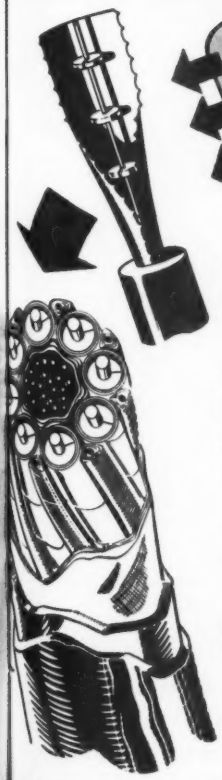
Department 23 • 4634 Lawton Ave. • Detroit 8, Michigan

PLEASE USE INFORM-A-GRAM FOR PRODUCT INFORMATION



IN EUROPE as in THE U. S. A.

BARTH DIES ARE PRODUCING SYNTHETIC SPACER DISCS for COAXIAL CABLE WIRES



OPERATING IN EUROPE in the plant of a world-renowned electrical manufacturer, these three sets of Barth Dies blank and pierce the synthetic spacer discs in the same operation.

The requirements of extreme accuracy plus continuous, high-speed production are fully achieved, furthermore, electric control switches functioning between die and press, stop the operation and avoid damage in case of ejection failure.

Barth Dies are an investment in maximum production, accuracy and life . . . they improve production and products . . . reduce costs.

Barth's catalogue contains valuable information on dies, tooling, special machinery and product designing. *Write for your copy.*

BARTH STAMPING & MACHINE WORKS Inc.
Denison at W. 34th St., Cleveland 9, Ohio

DESIGNERS AND BUILDERS OF DIES, TOOLS AND SPECIAL MACHINERY

NTDMA Fourth Annual New England Meeting

Improved manufacturing methods resulting in lowered production costs will be illustrated by a display of parts produced by various types of dies, molds, jigs and fixtures at the Fourth Annual New England Conference and Dinner of the National Tool and Die Manufacturers Association, Friday, May 14, Taft Hotel, New Haven, Connecticut. The regional associations sponsoring the Conference have a combined membership of 150 tool, die, mold and machine shops, employing a total of 3000 skilled toolmakers and machinists. Guest speakers will be Governor James C. Shannon of Connecticut, Mayor William C. Celentano of New Haven, and George S. Eaton, executive secretary, National Tool and Die Manufacturers Association. Richard Moore, president of the Moore Special Tool Company, will be toastmaster. Clifford J. Meaney of the Connecticut Tool and Engineering Company, Bridgeport, is General Chairman of the Conference.

GET **FEDERAL**

SHORT RUN STAMPINGS

FASTER!

Quick deliveries of high quality Federal stampings save you valuable time on design changes or important experimental work. Also helps you make faster shipments on your special orders. Federal stampings are accurate and money saving too.

WRITE FOR *FREE* BULLETIN NO. 101

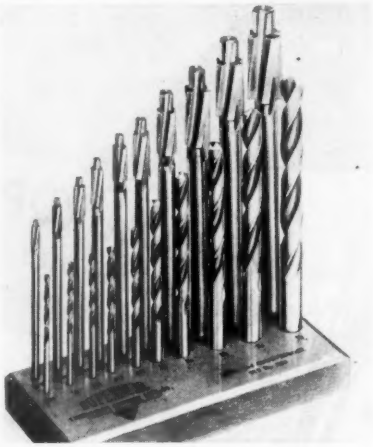
FEDERAL

TOOL & MFG. COMPANY

3214 West Ave. N. Minneapolis 12, Minn.

"Superbore" Drills and Counterbores

Designed to meet a production need for the drilling and counterboring of oversized holes, the Twentieth Century Manufacturing Company now delivers from stock, sets of drills and counterbores in standard sizes and oversizes above the standard sizes. Set No. 500 consists of ten standard dimension drills



and counterbores, set No. 400 is $\frac{1}{64}$" oversize above standard dimensions, and set No. 300 is $\frac{1}{32}$" oversize above standard. Each set is mounted in a stand and is individually "serial numbered" for positive identification by the user and for inventory control. Sizes are marked halfway up the stem to prevent obliteration. "Superbore" drills and counterbores provide that shade of difference that means perfect results when drilling and counterboring operations require oversize holes. "Superbore" products are made of supertough fine-grade high speed steel, heat-treated and precision machined throughout, assuring smooth, fast, and free-cutting operation. Fore and aft precision grinding of flutes and pilot allow chips to flow out freely. For complete information write Twentieth Century Mfg. Co., Dept. 11, 3720 Montrose Ave., Chicago 18, Ill., or circle Inform-A-Gram Key No. D33.

PLEASE USE INFORM-A-GRAM FOR PRODUCT INFORMATION

J&J

LIFT HOOKS

FOR THE SAFE, EASY HANDLING OF DIES AND HEAVY PARTS

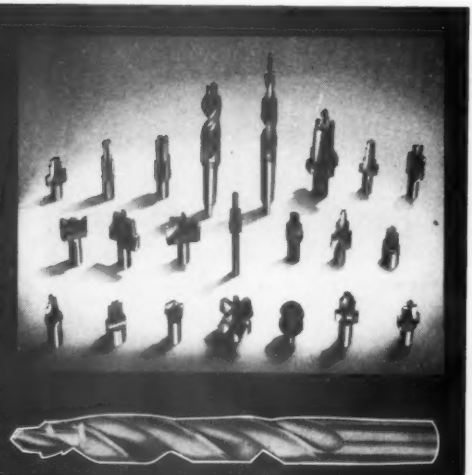
● J & J Lift Hooks have won enthusiastic endorsement from users everywhere. They speed handling—prevent accidents—and repay their initial cost in just a few days time. The forged chrome-nickel hook and chrome-vanadium bolts, magnaflux tested—and with self-cleaning, ground threads—cannot be disassembled, thus avoiding any danger of substituting low strength bolts. Four sizes with capacities up to 15 tons. Try a few—you'll never again be without them. Prices and fully descriptive data sheet sent promptly on request.

FORGE AND MACHINE DIVISION
OF

THE JOHNSTON & JENNINGS CO. 909 ADDISON ROAD CLEVELAND 14, OHIO

Spiral PRECISION TOOLS . . .

Make your tooling problem ours. We are equipped to make cutting tools of all kinds to YOUR SPECIFICATIONS, or our engineers will design the proper tools to do your job.
YOU CAN BANK ON OUR DELIVERY PROMISE. We make Eccentric Relief Cutting Tools, Carboloy-Tipped Cutting Tools, Step Drills, Step Reamers, etc. Tolerances are maintained exactly. Send us your sketch or blue print for quotation.
If it is a Cutting Tool We Make It.

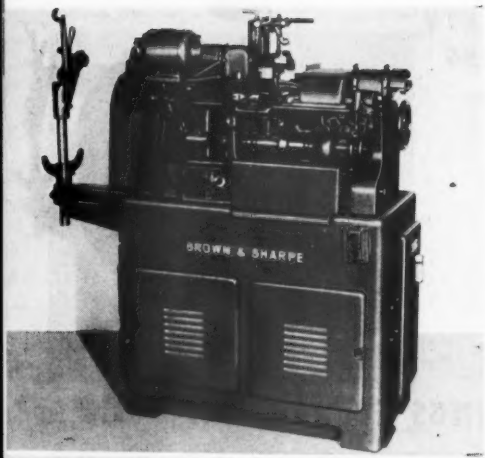


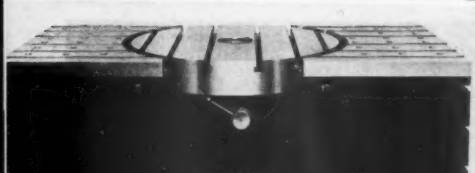
SPIRAL MANUFACTURING CORP.
3616 N. KILBOURN AVE. CHICAGO 41, ILLINOIS

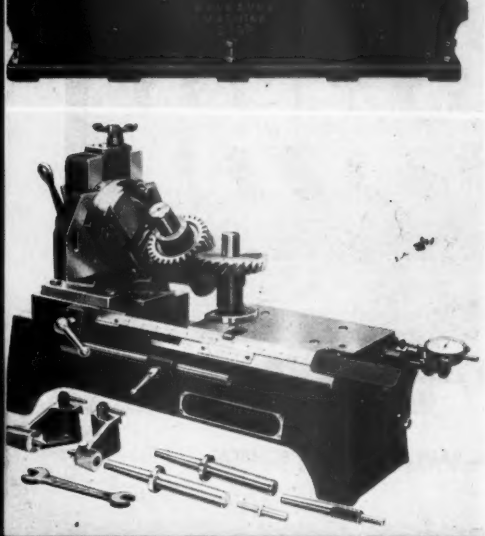
SEE ADVERTISERS INDEX, PAGE 83, FOR KEY NUMBERS

PROGRESS

NEW DEVELOPMENTS • IMPROVEMENTS • COST AND TIME SAVERS







CIRCLE KEY NUMBERS ON POSTAGE-FREE INFORM-A-GRAM INSERT FOR FURTHER INFORMATION

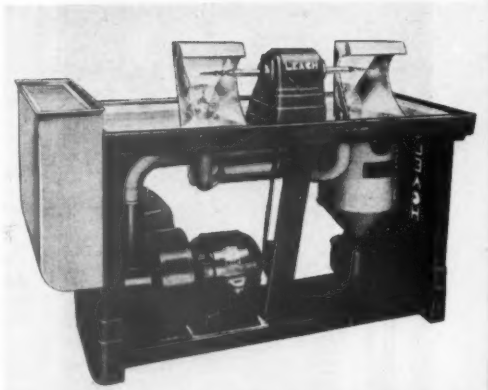
AUTOMATIC SCREW THREADING MACHINE, newly designed to take full advantage of overlapping operations for high production on small screws, nuts and bushings, is announced by Brown & Sharpe Manufacturing Company. The work spindle and threading spindle rotate in the same direction but at different speeds which permit the die or tap to cut at the required surface speed for threading, while the work rotates at suitable speed for turning or other operations. Attachments are available enabling performance of auxiliary operations in unison with the main operations. BROWN & SHARPE MFG. CO., Dept. 73, Providence 1, R. I., or circle Inform-A-Gram Key No. A90.

FOR SUPPORT OF HEAVY WORKPIECES without deflection, Kaukauna's Model 700 Indexing Table is designed for use with many types of machine tools. It is also ideally suited for inspection of layout work because of its unusual flexibility and rigidity. The main bed is of heavy well-ribbed cast iron construction with T-slots in the top and each end for clamping work in either horizontal or vertical plane. A 36" diameter indexing platen—also with T-slots for clamping—is in the center of the main bed. Manually operated, this can be locked in any position. KAUKAUNA MACHINE CORP., Dept. 86, Kaukauna, Wis., or circle Inform-A-Gram Key No. A89.

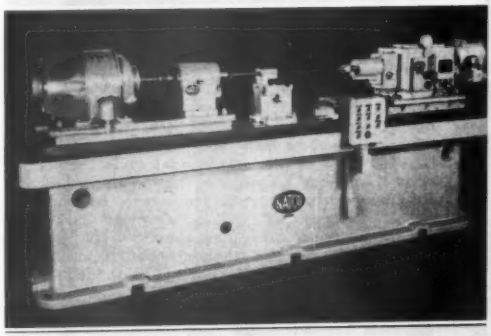
9" PARKSON GEAR TESTER has been redesigned for more efficient operation. The most outstanding improvement is an adjustable stop-rod, which eliminates the necessity of repeating the scale setting when a number of gears of the same size are to be tested. Instead, the stop-rod is set and clamped in position. This stop-rod is in addition to the precision scale and long vernier which are used for the setting of the center distance. Besides special gears, the machine is available for spur, bevel, and worm gears, either in combination or single purpose. For further information write GEORGE SCHERR CO., INC., Dept. 490, 200 Lafayette St., New York 12, N. Y., or circle Inform-A-Gram Key No. A86.

ON PARADE

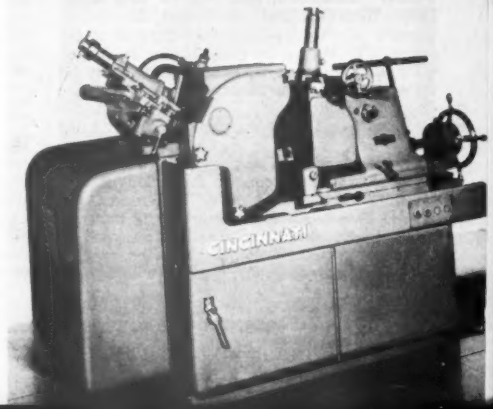
LEACH POLISHING BENCH is a self-contained complete unit for quick, economical polishing of small parts. The ball-bearing, 2-spindle polishing head accompanies various types of spindles, including taper spindles. The double spindle head is equipped for 2-speed operation, and direct drive to a 2hp motor. A noteworthy dust collection is accomplished in a cyclone with baffle plates and no water is used. Ruggedly built for long and continuous operation, the Leach Polishing Bench is particularly useful in the jewelry, plastic, and electrical industries. H. LEACH MACHINERY CO., Dept. 801, 287 Charles St., Providence 4, R. I., or circle Inform-A-Gram Key No. A91.



NATCO DEEP HOLE DRILLER incorporates several unusual features. Standard 2-lip twist drills or single lip gun drills can be used to advantage. Both the drill and the work can be revolved, only the work revolved, or only the drill revolved. In step drilling, the chips are removed by frequent withdrawal of the drill. Size permitting, oil passage drills are used and lubricant at high pressure is supplied to the point. Deep holes requiring smooth finish and minimum run-out are drilled with single lip gun drills at speeds higher and feeds lower than conventional for twist drills. Then, only the work revolves. A master control station provides centralized operator control and selector switch control for setup and cycle selections. For further details, write NATIONAL AUTOMATIC TOOL CO., INC., Dept. 69, Richmond, Ind., or circle Inform-A-Gram Key No. A88.



NEW CINCINNATI CENTERLESS GRINDING MACHINE has been announced recently by Cincinnati Grinders, Inc. Many new features have been incorporated into the machine for the purpose of promoting safety, lengthening the productive life span, and facilitating setups. The grinding wheel and regulating wheel spindles rotate on Cincinnati's Filmatic self-adjusting bearings—thus eliminating bearing maintenance. The regulating wheel is mounted on an adjustable horizontal swivel plate. Work of almost any shape or material classification can be ground within close limits of accuracy. CINCINNATI GRINDERS, INC., Dept. 8, Cincinnati 9, Ohio, or circle Inform-A-Gram Key No. A92.

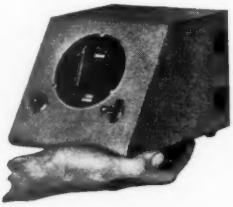


PROGRESS ON PARADE

COFFING "MIGHTY MIDGET" PULLER which pulls, lifts or stretches 75 times its own weight is detailed in new literature from Coffing Hoist Co. This "Mighty Midget" is designed to pull or lift 500 lbs easily in spite

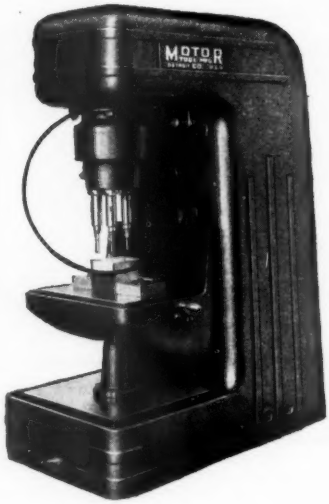
of its highly portable handy size. Its chain has a tensile yield of 2000 lbs; its snap hooks, a yield of 3000 lbs. Weighing only 6½ lbs (with chain), this midget puller features a two-way handle that can be used as a high-speed crank or ratchet lever. As an added safety factor, it has a safety load handle designed to bend at about 800 lbs, a level well below the yielding point of any other part of the puller. For full information write for Bulletin WMP-1 to COFFING HOIST CO., Dept. 56, Danville, Ill., or circle INFORM-A-GRAM Key No. A69.

NEW "TEMCOMETER", SERIES 1000 STEPLESS TEMPERATURE CONTROLLER, which consists of only the controller portion of the series 500 temperature controller and indicator (introduced last year and already in wide usage) has just been announced by the Thermo Electro Mfg. Co. Omission of the pyrometer and thermocouple, included in the 500 series, results in an inexpensive, modernly designed and engineered controller applicable where pyrometric indication of temperature is unnecessary or is already provided. This 1000 series controller is intended for use with electric heating devices such as furnaces, hot plates, heating mantles, melting pots, soldering irons, etc. Only five to 20 watt hours are required to operate this unit, and constant watt hour input is maintained, regardless of wide fluctuations in line voltage.



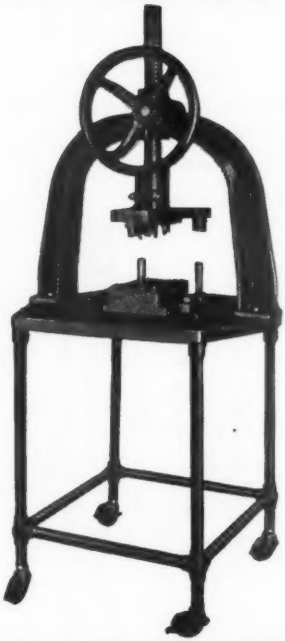
Eight models of the instrument are available covering most current requirements. Request details from THERMO ELECTRIC MFG. CO., Dept. 4-88, 474 W. Locust St., Dubuque, Iowa, or circle INFORM-A-GRAM Key No. A70.

FEATURING A QUICKLY INTERCHANGEABLE-TYPE MULTI-SPINDLE HEAD, the bench type tapping machine developed by the Motor Tool Mfg. Co., for a lower initial cost,



offers versatility, uniform power flow, easy and accurate operation and conservation of floor space. Meeting production demands for either short or long runs, this tapping machine operates at from 220 rpm to 760 rpm. MOTOR TOOL MFG. CO., Dept. 1-24, 7777 Cortland Ave., Detroit 4, Mich., or circle INFORM-A-GRAM Key No. A71.

COMPLETE THE DIE-SET AT YOUR BENCH



LACEY DIE-SET MACHINE

Here is a truly "one man" press that operates with one hand and under full manual and visual control.

Handy for tool and press rooms, it permits the diemaker to complete a die-set *right at his bench* . . saves tool room and handling costs.

Positive, true punch-to-die alignment is assured at all times, thanks to the Lacey's sturdy, open construction. And punches can be removed as often as needed without disturbing alignment once the die-shoe is clamped to the table and punch holder fixed in position in the ram. No pry bar or hammer is needed to separate punches.

The Lacey Die-Set machine is sensitive for delicate work yet rugged enough for fitting up heavy die-sets. Useful, too, for shearing certain types of punches.

Write today for complete details.

Sole Distributors

MOORE SPECIAL TOOL CO., INC.
740 Union Ave. Bridgeport 7, Conn.

Quick Acting JOHNSON FURNACES

TURN THE HEAT ON HIGH SPEED STEELS with JOHNSON No. 130A

For low cost heat treating high speed steels, dies, tools. Reaches operating temperatures FAST. Saves time and gas. Counterbalanced door opens upward. Complete with Carborfrax Hearth, G.E. Motor and Johnson Blower.

FIREBOX
7¾" high
13 " wide
16½" long

WRITE FOR COMPLETE SPECIFICATIONS

4-Burner for 1400-2350° F.....$295.00
6-Burner for 1800-2400° F.....$325.00

FREE CATALOG . . . SEND COUPON

JOHNSON GAS APPLIANCE CO.
579 E Ave. N. W., Cedar Rapids, Iowa

Name _____

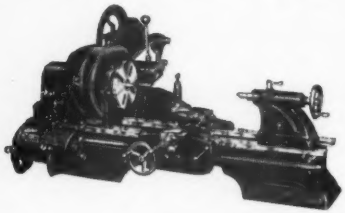
Address _____

City _____ Zone ___ State _____

SEE ADVERTISERS INDEX, PAGE 83, FOR KEY NUMBERS

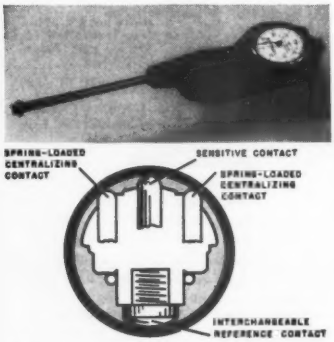
PROGRESS ON PARADE

NEW ATLAS 10" QUICK-CHANGE LATHES, which save setup and operating time, are announced in an illustrated catalog from the Atlas Press Co. The quick change mechanism on these new lathes provides instant fingertip selection of 54 threads and feeds—



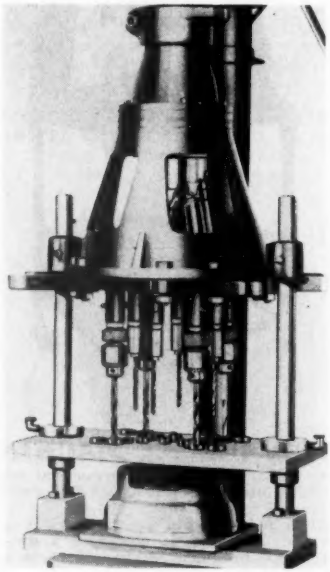
45 are obtained by merely shifting two levers on the gear box, and an additional nine by changing the position of a sliding gear. A convenient tumbler gear lever reverses gears or disengages them from lead screw. This quick-change mechanism does not in any way limit the odd thread and feed range capacity of the lathe. By varying the gear train with change gears (available) hundreds of additional threads and feeds are obtained. Two bed lengths, each with a capacity of 24" and 36" between centers, are available. Request catalog and details from ATLAS PRESS CO., Dept. 5-37, 2312 N. Pitcher St., Kalamazoo 13D, Mich., or circle INFORM-A-GRAM Key No. A43.

SELF-CENTRALIZING HOLE GAGE which shows size variations in tenths of thousandths and which employs fourteen interchangeable extensions to cover the full range from ¼"



to ½" diameter readings is manufactured by Federal Products Corp. The spring-centralizing design of this gage plus the precise measuring contacts and motion transfer units locate themselves in the hole and show the true diameter reading accurately. It also explores any hole within its capacity to a maximum depth of 2¼", revealing diameter, roundness, taper, bellmouth, and other hole inaccuracies. Complete details are available from FEDERAL PRODUCTS CORP., Dept. 4, 1144 Eddy St., Providence, R. I., or circle INFORM-A-GRAM Key No. A44.

ADJUSTABLE SPINDLE WORK HEAD, manufactured by International Research Corp., attaches quickly to any standard drill press and the spindles may be adjusted to any desired pattern to suit product requirements.



A typical example of the versatility of this IRC adjustable work head is illustrated here. The work head has a sub base with a jig arrangement for machining parts of an electric motor. The jig plate has 27 bushings, four spindles are provided with standard drill chucks, and four spindles have collets to allow closer spacing of holes. With this arrangement ten different electric motor parts are drilled, reamed, spot-faced, or tapped at different setups with just one IRC adjustable spindle work head. Complete information is available from INTERNATIONAL RESEARCH CORP., Dept. 41, 2838 E. Olympic Blvd., Los Angeles 23, Calif., or circle INFORM-A-GRAM Key No. A45.

make LIGHT work of HEAVY dies

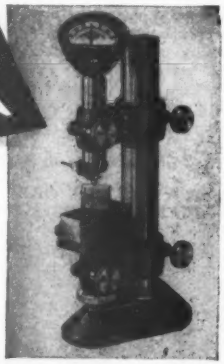
With the BARRETT LIFTING TABLE—you can do it economically, too! It lifts and lowers heavy dies by simple crank operation—provides easy conveying on smooth-rolling, heavy-duty casters. Barrett Lifting Table cuts costs, cuts time, safeguards men and dies. It's invaluable in carrying dies to and from machines... in supporting long bars, sheets, frames, etc. Available in 2 capacities, 2000 and 3000 lbs. *Write for full details.*

BARRETT-CRAVENS COMPANY
4633 S. Western Blvd., • Chicago 9, Ill.
Representatives in all Principal Cities
Canadian Licensee: S. A. Armstrong Ltd., Toronto

BARRETT
Barrett Handling Equipment
ONE MAN DOES MORE THAN 3 OR 4 ... WITH A BARRETT

MIKROKATOR
"MIKRO" (MINUTE)
FRICTIONLESS AMPLIFICATION

Positive, Dependable Repeat Readings



NO friction, lag or backlash . . . no racks, pinions, gears, levers, etc. subject to wear. Pointer responds instantly without swinging past true reading. Amplification is 100% mechanical, no lights or electromagnets, no warming up period required. Easily moved to different locations as there are no electrical connections. Our engineering department is at your service for applying Mikrokator to your measuring problem.

WRITE FOR LITERATURE—T.D.J.

Graduated — .0001" to .000002".

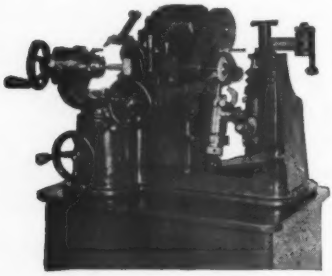
Graduated — .001 mm to .0002 mm.

SWEDISH GAGE CO., OF AMERICA
8900 ALPINE AVE., DETROIT 4, MICH.

SEE ADVERTISERS INDEX, PAGE 83, FOR KEY NUMBERS

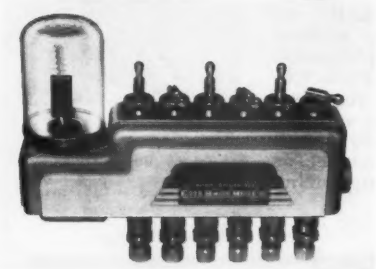
PROGRESS ON PARADE

NEW MODEL 1100 "HYBCO" TAP GRINDER, a complete tap reconditioning machine, sharpens and relieves chamfers, grinds flutes and spiral or gun points and, as the taps are held in precision collets by the shank, recon-



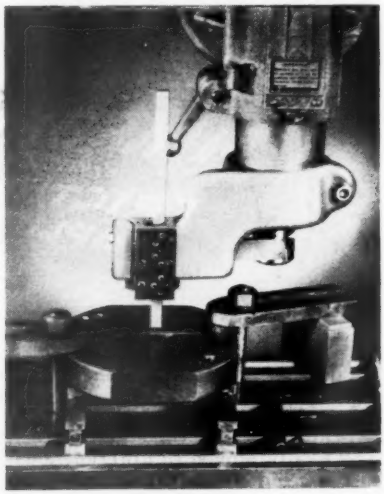
ditions after the tap center has been destroyed or the tap broken. Any chamfer angle can be obtained, from 5° to 60°, with the Model 1100 "Hybco" and is done on the left-hand side of the machine; flute sharpening, spiral or gun pointing is performed on the right-hand side of the machine; and permanently mounted diamond dressers are furnished for truing the chamfer sharpening wheel and forming the radii of the flute sharpening wheel. This new "Hybco" has a capacity of #2 machine screws to 1½" hand taps, and ⅛" to 1" pipe taps. Also taps with from two to eight flutes and right- or left-hand threads can be sharpened. Request details from HENRY P. BOGGIS & CO., Dept. 8-02, 1279 W. Third St., Cleveland 13, Ohio, or circle INFORM-A-GRAM Key No. A36.

A NEW MULTIPLE OILER FEATURING A "CONSTANT LEVEL" SYSTEM includes in its



construction a series of valves—one for each of the leads—that permits flow to each bearing to be adjusted individually or turned completely on or off. This centralized unit is made up of a transparent reservoir of unbreakable plastic with a non-spill refilling valve and a main reservoir from which copper tubes lead to the various remote oiling points. The system maintains the oil at an even level, insuring a well regulated abundance of oil to the individual bearing. Also this "Constant Level" system may serve more than one machine, or it may serve complex units with independently working parts. Complete information is available from GITS BROTHERS MFG. CO., Dept. 23, 1846 S. Kilbourn Ave., Chicago 23, Ill., or circle INFORM-A-GRAM Key No. A37.

A NEW TYPE ATTACHMENT, called the "Will-Wood", that saves labor, time, and money in the production of templates, punches, and dies by permitting the use of ordinary mill files with index and Bridgeport milling machines is now being manufactured and distributed by W & W Tool & Die, Inc. This "Will-Wood" device is easily and quickly installed on the machine spindle from which the cutter has been removed; it is also readily



adapted to all other types of high-speed heads. The rigidity of the file held in this "Will-Wood" attachment and the smooth filing stroke (½" only) insure clean, sharp filing of corners, straight lands on dies and punches, contours, and radii. Accuracy is limited only by the accuracy of the feed dials on the machine. Request details from W & W TOOL & DIE, INC., Dept. 49, Midland, Mich., or circle INFORM-A-GRAM Key No. A38.

NIAGARA Aero Cooling Pays for Itself!

Saves Cooling Water, Increases Capacity, Saves Operating Costs

●

NIAGARA Aero HEAT EXCHANGER

Cools fluids to within 10° of atmospheric wet bulb temperature; holds to tolerances of 2°F.

Heat treaters increase production, improve quality, decrease rejections by controlling quenching bath temperatures with NIAGARA Aero Heat Exchanger.

Also used in liquid cooling in industrial and chemical processes, water jacket cooling, hydraulic fluid, transformer oil, lubricating and cutting oil cooling, vapor and steam condensing.

NIAGARA Aero AFTER-COOLER

Furnishes drier compressed air . . . eliminates half the moisture allowed by conventional after-cooling methods. Protects your air tools.

NIAGARA BLOWER COMPANY *Over 30 Years of Service in Industrial Air Engineering*

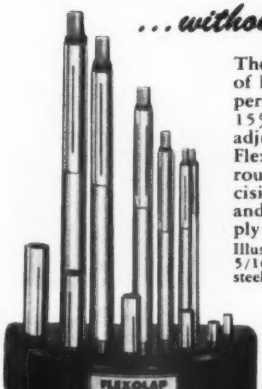
Dept. TD-58, 405 Lexington Ave., New York 17, N. Y.

Field Engineering Offices in Principal Cities

Flexolap... INSTANTLY AND ACCURATELY

ADJUSTABLE FOR FAST CUTTING AND POLISHING

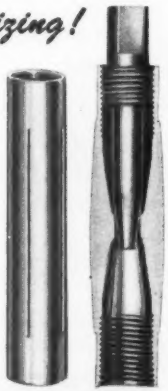
...without danger of galling or seizing!



The Flexolap barrel is made with a series of longitudinal slots milled "off-center" to permit sensitively flexible expansion up to 15% — or more — under pressure of the adjusting pin. This construction enables Flexolap to save valuable time and to lap rounder, straighter holes. For accurate precision take-up, as desired, to maintain size and compensate for wear on barrel . . . simply turn adjustment screw.

Illustrated at left is Set No. 1. Six sizes (3/16", 1/4", 5/16", 3/8", 7/16" and 1/2") with six brass and six steel barrels on wood stand, complete.....**$12.75**

Also available in sizes 7/32", 9/32", 11/32" 13/32", 15/32", 9/16" and 5/8". For lapping holes smaller than 3/16", use the *Midget Lap*. Fourteen sizes: .032, .036, .040, .046, .054, .070, .079, .090, .104, .120, .135, .155, .170. Trial assortment (14 laps).....**$1.50**



Write today for complete particulars

FEDERAL TOOL CORP., 401 N. LEAVITT ST., CHICAGO 12, U. S. A.

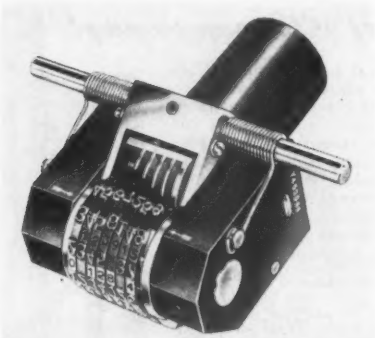
SEE ADVERTISERS INDEX, PAGE 83, FOR KEY NUMBERS

PROGRESS ON PARADE

NEW IMPROVED TIPS FOR THE "KANT-MAR" HAMMER featuring "Velv-Alum", a

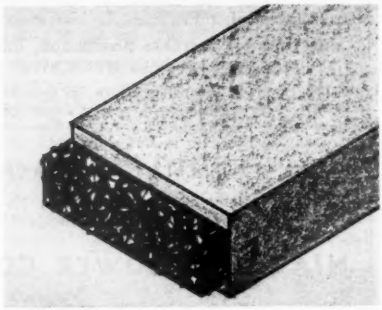
precision turned aluminum alloy that is easily replaceable after hard wear, is announced by the manufacturer, Schmidgall Mfg. Co. This new material "Velv-Alum" is sufficiently tough to take the punishment given in garages, machine shops and foundries, yet is soft enough so as not to mar the delicate surfaces encountered in the tool room on dies. "Velv-Alum" also reduces the chance of eye injury due to chipping, and the "Kant-Mar" hammer is perfectly balanced to practically end rebound accidents. Prices and complete details are available from SCHMIDGALL MFG. CO., Dept. 21, 307-11 Cass St., Peoria 2, Ill. INFORM-A-GRAM Key No. A39.

INDENTING NUMBERING HEAD, Model 23, engineered and developed by William A. Force & Company, and its ebony finished head for corrosion-resistance is completely



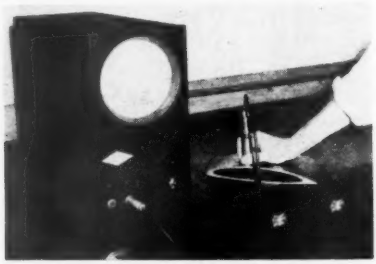
discussed in new literature from the company. This Force Model 23 Indenting Numbering Head will number by serial metal, plastics, etc., up to press feeds, and can be obtained in either automatic or non-automatic style. WILLIAM A. FORCE & COMPANY, Dept. 2-93, 107 Worth St., New York 13, New York. INFORM-A-GRAM Key No. A40.

"STEELSET" AREA-TYPE DRESSERS. Simultaneous action of a large number of cutting points impregnated with smaller, less expensive diamonds, make for faster cutting or truing plus longer life. The result is lower cost per dressing. There is only a small loss if



one of the many small stones is damaged or pulled out of the matrix; many others are around or behind it to take its place. For complete information address FISH-SCHURMAN CORP., Dept. 60, 230 E. 45th St., New York, N. Y., or circle INFORM-A-GRAM Key No. A41.

UTILIZING SUPERSONICS FOR THICKNESS MEASUREMENT and flaw detection, the Reflectogage, developed by Sperry Products, Inc., can measure the thickness of metals and other materials where access from only one



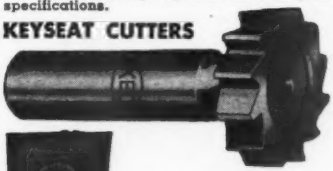
side is available. A quartz crystal searching unit is applied and the position of the vertical deflection of the oscilloscope trace indicates the frequency and thickness of the material. SPERRY PRODUCTS CO., INC., Dept. 85, 15th St. and Willow Ave., Hoboken, N. J. INFORM-A-GRAM Key No. A42.

KEO

CENTER DRILLS

Made of finest high speed steel. Available in all standard sizes. Always in stock for *immediate delivery*. Specials made to your specifications.

KEYSEAT CUTTERS



High speed. Right hand. ½" shank. Diameters from ¼" to 1⅛". Standard sizes in stock for immediate delivery. Complete set —41 sizes—available in sturdy, hardwood box. Saves time and money, because you always have the size you need.

CENTER REAMERS

High speed steel. Reamers from ¼" to 1" regularly furnished with 60°, 82° or 90° included angle. Specials made to your specifications.

LATHE MANDRELS

Precision made of tool steel, hardened and accurately ground. Tapered .0005" to the inch. Mandrels from 3/16" to 1" are .0005" undersize at small end, from 1-1/16" to 3", .001" undersize. Immediate delivery.

Write for Literature

Illustrated literature and prices on all KEO Products mailed on request.

KEO CUTTERS Inc.

19326 Woodward - Detroit 3 Mich.

Better Work at LOWER COST

OLIVER DIEMAKING MACHINE

SAWING—FILING—LAPPING

The Oliver Bench Model Die Making Machine is truly a heavy duty machine but performs equally as well on light work . . . Many of these machines have been in continuous use for over 25 years; sawing, filing and lapping tool steels up to 1″ thick. (Heavy duty model for 3″ work.)

Direct labor costs in many cases have been cut 50 to 60%.

Send for catalog

IMPROVE YOUR TOOLROOM IT'S THE BACKBONE OF PRODUCTION

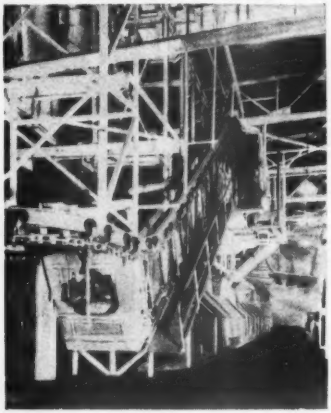
Oliver Instrument Co.

1436 E. Maumee Adrian, Michigan

OLIVER OF ADRIAN

PROGRESS ON PARADE

CONTINUOUS FURNACE FOR RELIEVING STRESSES in V-type automobile cylinder block castings, designed so that the whole unit suspends from the ceiling, has been introduced by Bellevue Industrial Furnace Co. Gas fired with forty pressure type burners, the walls of



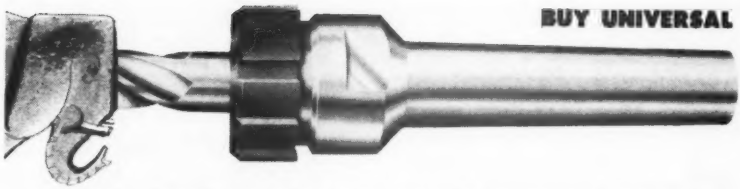
this furnace are nine inches thick, consisting 4½" of 2000° F insulating brick. Also there are two heat zones automatically controlled by a Brown Electronic Potentiometer. Steel plates, all properly reinforced with structural steel shapes, form the casing of this new furnace. Request further information from BELLEVUE INDUSTRIAL FURNACE CO., Dept. 47, 2971 Bellevue Ave., Detroit 7, Mich., or circle INFORM-A-GRAM Key No. A50.

UNIVERSAL RODS AND HANGERS designed to save time, money and effort in gear

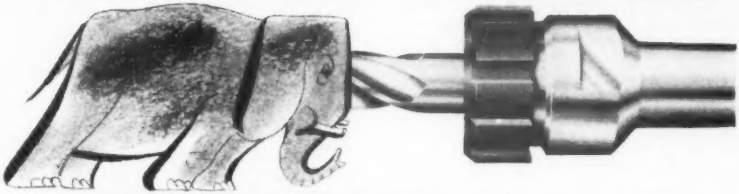
handling are described in new literature just received from the Rack Engineering Co. This method of gear handling protects the highly finished surfaces and is one of the most efficient and practical ever developed for pick-up and disposal of odd or complex parts. The Rack method of controlled material placement, used virtually in all industries, is completely discussed along with savings effected from its use in this new literature. Further information on these rods and hangers is available from RACK ENGINEERING CO., Dept. 45, 5102 Bulles, Pittsburgh, Pa., or circle INFORM-A-GRAM Key No. A51.

SMALL ZINC PARTS AVAILABLE through new die-casting process to general industry from Gries Reproducer Corp. This specialized patented process opens up opportunities for the development of new products and the improvement of current designs of really small

zinc die castings. Covering tiny parts of ½ ounce maximum size—unlimited minimum size—Gries offers quick service and important economies to manufacturers. Gries Reproducer Corp. is equipped to deliver quantities from 100,000 to millions, have complete facilities for secondary operations, assembly and surface finishing, and maintain close tolerances where required. Samples of die castings and a bulletin describing the process and facilities offered are available from GRIES REPRODUCER CORP., Dept. 43, 780 E. 133rd St., New York 54, N. Y., or circle INFORM-A-GRAM Key No. A52.



6 TON THRUST LOADS CAN'T BUDGE TOOLS



GRIPPED IN UNIVERSAL COLLET CHUCKS

UNIVERSAL ENGINEERING COMPANY

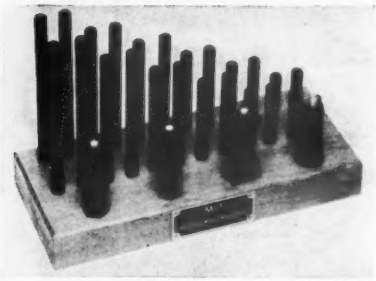
FRANKENMUTH 8, MICHIGAN

Save Time & Money
WESPO
Over 350 Standard Fixture Parts Available
All Cadmium Plated
SEND FOR BULLETIN—TEMPLATE SHEETS AVAILABLE
WEST POINT MANUFACTURING COMPANY
19625 MERRIMAN COURT • FARMINGTON, MICHIGAN

SEE ADVERTISERS INDEX, PAGE 83, FOR KEY NUMBERS

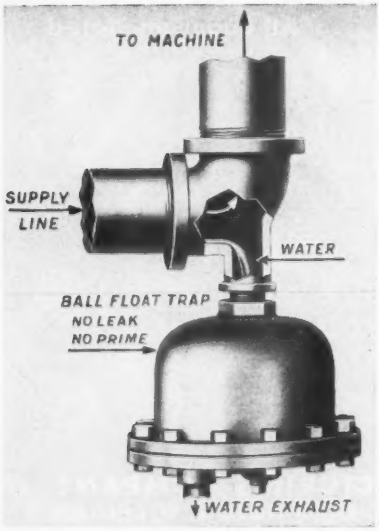
PROGRESS ON PARADE

A NEW SET-UP NUT AND STUD SET has recently been introduced by Morton Machine Works of Ferndale, Michigan. These sets are available in ½", ⅝" and ¾" standard thread sizes. Each set includes 41 pieces with studs from 3" to 8" long, and by using the extension nuts furnished with the sets, a great



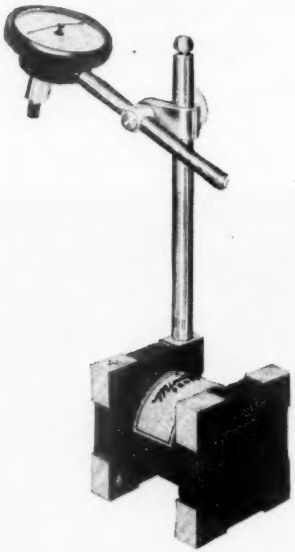
range of stud lengths is possible. For further information write MORTON MACHINE WORKS, Dept. 69, 2421 Wolcott St., Ferndale 20, Mich., or circle Inform-A-Gram Key No. A18.

MURPHY HEEL TRAP, together with a Murphy Automatic Trap, is recommended to compressed air users who encounter moisture



condensation in spots where the air line bends from horizontal to vertical and wish to overcome this nuisance. The trap may be installed at any convenient spot near post or wall and a pipe lead from the trap to the heel. For more information write to JAS. J. MURPHY & CO., Fifth & Vine Sts., Hamilton, Ohio, or circle Inform-A-Gram Key No. A17.

"MINUTE MAN" MAGNETIC BASE permits instant positioning and application of gages to the most convenient and desirable spot in milling, grinding, shaping, etc. Interchangeable brass shafts are provided for ready attachment of any dial indicator gage or height gage. This permanent-magnet base has a 40 to 50 pound grip on all four sides, the holding power of which lasts indefinitely and requires no "keeper". Valuable time is saved by this handy Magnetic Base—its easy

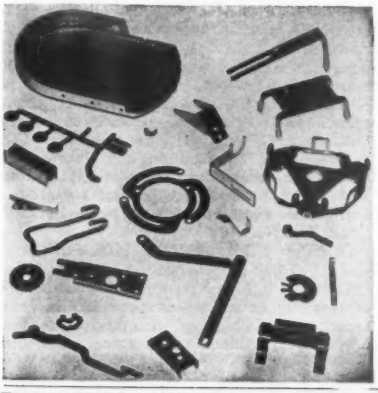


application eliminates the need for clamps, fixtures, or special attachments. It may also be used for holding work in position on surface plates for layout; for supplying magnetic power to rods for chip removal; and for holding nozzles of coolant pipes on machine tools. For complete details write to THE duMONT CORP., Dept. 37, Greenfield, Mass., or circle Inform-A-Gram Key No. A8.

DIE CUT PARTS

NEW • SPEEDY • ECONOMICAL

For Experimental and Model Work



Our Specialty: Small irregular shaped parts stamped, formed, pierced, extruded or tapped to your specifications using our new method of semi-permanent dies in conjunction with our quick-process temporary dies.

For detailed information send for literature. For firm quotations and delivery commitments, send us your prints.

WLS STAMPING COMPANY

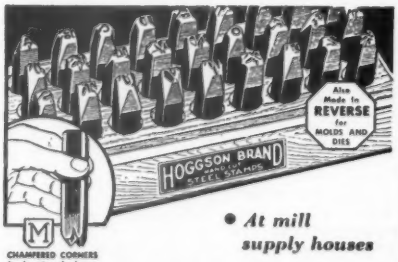
Short Run Stampings

3290 East 80th Street
Cleveland 4, Ohio

HOGGSON BRAND
Since 1849

HAND-CUT Steel Stamps
Letters and Figures

Deep, hand-cut letters in special-formula steel—result of 90 years of die making—assure clean impressions and long service. Face of stamp is angled for extra strength. Ideal for parts and tool marking and numbering. Also made in reverse for marking molds and dies.



CHAMFERED CORNERS for locating the base

• *At mill supply houses*

HOGGSON & PETTIS MFG. CO. • New Haven, Conn.

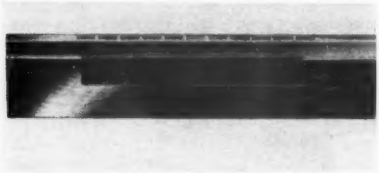
SEE ADVERTISERS INDEX, PAGE 83, FOR KEY NUMBERS

PROGRESS ON PARADE

ADDITION OF SQUARE STYLE GAGE BLOCKS to their well-known line of Lifetime-Carbide Gage Blocks has been announced by The Fonda Gage Company. The Grade "AA" (±0.000002 inch) quality is in addition to those announced in this department in April of this year which were Grade "A"

(±0.000004 inch) and Grade "B" (±0.000008 inch) quality. These Fonda gage blocks come in complete sets made up of 35 and 82 pieces and will outwear high carbon steel blocks 139 to 1. They will retain their original surface finish and will not corrode. For further information write to THE FONDA GAGE CO., Dept. 998, 59 Daly St., Stamford, Conn., or circle Inform-A-Gram Key No. A15.

CENTERLESS GRINDER WORK REST BLADE, known as the "Clifco" blade, which combines the hardness of tungsten carbide with the strength of steel—extending the potential life of the blade almost indefinitely



—has been developed by The Cliff Co. Design of this new blade features at the wearing surface sectional inserts of tungsten carbide separated by thin strips of a specially developed alloy. THE CLIFF CO., Dept. 47, 17 N. Leclaire Ave., Chicago 44, Ill. INFORM-A-GRAM Key No. A49.

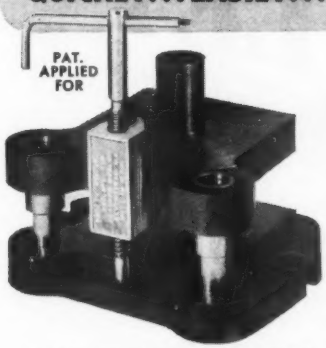
SPE-D-CUT REAMERS, a new line of reamers to be sold in the price range of high-speed steel reamers, is announced by Wendt-Sonis Company. They are available in 13 different diameters—all in straight-shank styles—and embody precision qualities of higher priced reamers, such as precision tolerances and diamond lapped cutting edges. The reamers may be used on both ferrous and non-ferrous materials. For more information write WENDT-SONIS CO., Dept. 518, 10th & Collier Sts., Hannibal, Mo., or circle Inform-A-Gram Key No. A85.

A NEW TYPE MILLING MOUNTING has been designed and developed by Rusnok Tool Works which is easily adaptable to any old or new Rusnok milling attachment. Shop men report this "Rail Type" mounting to be fully universal. Milling attachments employing

this "Rail Type" bracket are operated on either side, or directly in front, of the overarm. The milling attachment can be quickly and easily placed and rigidly locked in any position within a full 180-degree adjustment. For further details write to RUSNOK TOOL WORKS, Dept. 578, 4840 W. North Ave., Chicago 39, Ill. Inform-A-Gram Key No. A16.

DIE SETS SEPARATED AND ASSEMBLED QUICKLY...EASILY...SAFELY...WITH THE NEW

PERSSON DIE JACKS



Eliminate old-fashioned, unsafe prying or hammering methods in your shop. Just clamp on punch holder and turn handle. Punch holder is raised or lowered smoothly - always under control. Die Jacks are made from fine steel and alloys. They are precision built tools every tool maker will want for his tool box or bench drawer.

NO PRYING OR HAMMERING — EASY DOES IT EVERYTIME!

A few good territories still open for representation. Write for details and literature.

T. G. PERSSON MFG. CO., 224 GLENWOOD AVE., BLOOMFIELD 4, N. J.

You'll Break Records!

with your production assemblies when you use

DETROIT POWER SCREWDRIVERS

Model B

● You can drive screws at the amazing speed of one a second, effect a big saving in time and labor, and reduce costs substantially with these modern hopper-fed machines. 3 models to drive screws from No. 2 to 5/8" diameter. Will not mar heads or strip threads. All screws driven to uniform tension.

Send Sample Assemblies for Estimate and Free Catalog

DETROIT POWER SCREWDRIVER CO. 2027 West Fort Street, Detroit 16, • Michigan

SEE ADVERTISERS INDEX, PAGE 83, FOR KEY NUMBERS

LINLEY

FOR NOISELESS, HIGH SPEED RIVETING

Rotary spinning principle shapes uniform heads, silently . . . capacities up to 3/8 inches diameters. Adjustable spindle stroke, controlled pressure . . . double row radial thrust bearing supports spindle, assures long life. Table elevating screw prevents slipping. Six floor or space-saving bench models . . . sturdily built for trouble-free operation under severe production schedules.

FOR COMPLETE INFORMATION, WRITE FOR BULLETIN.

LINLEY BROTHERS CO., 669 STATE ST. EXTENSION BRIDGEPORT 1, CONNECTICUT

Sawing

Stoning

TRIPLE PURPOSE MACHINE

FILES . . . SAWS . . . STONES

ILLINOIS DIE FILING MACHINE

An accurate, smoothly-operating machine that files, saws and stones the most intricate die shapes . . . eliminates tedious hand operations . . . reduces costs. It is quality-built for long, trouble-free service . . . hardened and ground shafts running in bronze bushings minimize wear. The holding chuck and clamping device provide perfect file alignment.

Write for descriptive literature.

ILLINOIS TOOL WORKS

2501 N. Keeler Ave. • Chicago 39, Ill.

MANUFACTURERS OF METAL CUTTING TOOLS AND SHAKEPROOF PRODUCTS

PLEASE USE INFORM-A-GRAM FOR PRODUCT INFORMATION

PUBLICATION PREVIEWS

Keep Informed! CATALOGS • BULLETINS • SPECIFICATIONS

Circle postage-free Inform-a-Gram Key Number for your request

CAMS AND FORM TOOLS WHICH MAXIMIZE MACHINE PRODUCTION for greater output with accuracy are described in a new four-page bulletin from the Stites Tool Co. Both cams and form tools, designed, engineered, and manufactured by Stites, have dimensions checked 100% to hold tolerances within tenths of a thousandth of an inch wherever necessary. All rises on cam lobes are generated to insure an accurate advance of tools into the work. Circular form tools for Brown & Sharpe Automatic Screw Machines are built of high speed steel, are ground all over, and are hardened to Rockwell C63-65. For a copy of this bulletin and information on how to secure cam sheets, without charge, for laying out any operation, address THE STITES TOOL CO., Dept. 9-40, 1426 W. Third St., Cleveland 13, Ohio, or circle INFORM-A-GRAM Key No. B83.

NEW DUPLEX PUNCH AND DIE FILING MACHINE that features a retractable file is announced in a comprehensive, illustrated four-page folder from Ideal Tool & Die Co. This versatile machine can be used for filing, sawing, scooping, and lapping operations on dies, templates, cams, patterns, blind holes and cavities, molds, and flanged punches. These operations for this Duplex No. D-5, plus its use as a die filer and its conversion to a punch and blind-hole filer, are operationally described to show advantages and performance. A copy of this bulletin, also illustrating two other models, will be sent upon request from IDEAL TOOL & DIE CO., Dept. 1-47, 733-735 Congress St., Schenectady 3, N. Y., or circle INFORM-A-GRAM Key No. B80.

SECRET OF "SOL-SPEEDI-DRI" ABSORBENT, a cleaning and preservative granular mineral that reduces fire hazard and cuts down slipping accidents on wood, cement or composition floors, is revealed in a new six-page brochure from Safety & Maintenance Co. The effectiveness of "Sol-Speedi-Dri" absorbent for all types of liquids—oil, water, grease, resins and acids—is given detailed treatment along with its ability to salvage tools, reclaim oil- and moisture-soaked work shoes, clothing and transmission belting. A sample of "Sol-Speedi-Dri" and this explanatory brochure will be sent upon request from SAFETY & MAINTENANCE CO., INC., Dept. 97, No. 1 Wall St., New York 5, N. Y., or circle INFORM-A-GRAM Key No. B81.

STEEL RULE DIE CUTTING METHOD for cutting sheet metals, plastics, wood, linoleum, and other soft materials is technically and comprehensively discussed from an engineering viewpoint in a brochure issued by Accurate Steel Rule Die Mfgs. Schematic diagrams assist in the all-inclusive description of the die cutting process and show the many advantages of this method in producing experimental pieces and regular production runs. Also the low cost and rapid service of this type of die are covered. This brochure is available by writing upon your company letterhead to ACCURATE STEEL RULE DIE MFGS., Dept. 73, 22 West 21 St., New York 10, N. Y. INFORM-A-GRAM Key No. B82.

HYPREZ DIAMOND COMPOUNDS, a product of Engis Equipment Co., are now being used by die manufacturers and die casting plants to finish and refinish their die casting dies, leaving them free from nicks, scratches and pits, and with high mirror polish in the die cavity. Hyprex Diamond Compounds are also being used for the lapping of leader pins, bushings and inserts. The abrasive content of these Hyprez Diamond Compounds consists only of clean, virgin, accurately-graded diamond powders, uniformly distributed and permanently suspended in a stable compound of identifying integral color. Sealed in dustproof glass cartridges, the compound is loaded in the Hyprez applicator gun, which is designed for ease and economy of operation even by the inexperienced. ENGIS EQUIPMENT CO., Hyprez Div., Dept. 9-39, 431 S. Dearborn St., Chicago 5, Ill., or circle INFORM-A-GRAM Key No. B84.

PUBLICATION PREVIEWS

BUFFING AND POLISHING MACHINES of the heavy duty and extra heavy duty type, in sizes ranging from ½ to 60 hp, are discussed and illustrated in a new 16-page catalog from The Standard Electrical Tool Co. In addition to the coverage of these machines, this catalog also features the line of infinitely variable speed buffing and polishing machines with the "Speedial" control, the control which permits instantly obtaining any speed desired between 1500 and 3000 rpm. Request Catalog No. B-10 from THE STANDARD ELECTRICAL TOOL CO., Dept. 4-70, Mt. Hope & Sixth Sts., Cincinnati 4, Ohio, or circle INFORM-A-GRAM Key No. B28.

STANDARD JIG AND FIXTURE COMPONENTS, believed by the manufacturer to be the most useful line in the tool industry, are shown by 45 specification sheets (which can be used as tracing templates wherever designated) in a new 50-page loose leaf catalog issued by Noble & Stanton, Inc. All individual parts and assemblies as well as components of the assemblies are completely detailed, dimensioned, and priced to show how tool room costs can be cut by using standard jig and fixture components. How the use of tracing templates will save many hours of design time in the drafting room is readily seen by the sheets and also described. This valuable loose leaf catalog is available upon request from NOBLE & STANTON, INC., Dept. 7, 1002 Broadway, Bedford, Ohio, or circle INFORM-A-GRAM Key No. B29.

A NEW SERIES OF TAPPING MACHINES manufactured by Procunier Safety Chuck Co. are shown by large illustrations and phantom drawings in a booklet giving all their details, specifications, and important features. Among the improvements for these new tapping machines fully treated in this fact-packed booklet are: the pump, a motor driven gear type providing a continuous flow of lubrication to the tap; the foot operating mechanism, giving easy and quick operation for all jobs; and the sensitive high-speed tapping head, furnishing all the advantages desired in a universal tapping machine. Request your copy of Booklet D-47 from PROCUNIER SAFETY CHUCK CO., Dept. 6-23, 12-14 S. Clinton St., Chicago 6, Ill., or circle INFORM-A-GRAM Key No. B30.

PRODUCING ACCURACY AND FINISH AT LOW COST for small lot or odd size production, salvage and production repair, selective fitting of mating parts, and repair and maintenance of operating equipment by using portable hones is technically discussed in an illustrated four-page bulletin from Sunnen Products Co. "How-to-do-it" photographs showing examples of many honing jobs in operation and a stone selection table that tells how to select the correct stone for different materials are also included. Request your copy from SUNNEN PRODUCTS CO., Dept. 5-83, 7900 Manchester Ave., St. Louis 17, Mo. INFORM-A-GRAM Key No. B31.

FOUR-SPINDLE AUTOMATIC CHUCKING MACHINES, Models 475, 49 and 412, which are identical in basic construction and design —differing only in size and chuck capacity— are described from an engineering viewpoint in a 12-page catalog issued by The New Britain Machine Co. Photographs of the exclusive features on these machines are accompanied by comprehensive text that will please the tool designer, setup man, and operator alike. Request a copy from THE NEW BRITAIN MACHINE CO., 20 South St., New Britain, Conn. INFORM-A-GRAM Key No. B32.

"TANGENT BENDER NEWS" is the title of a new publication originating from Struthers Wells Corporation that is to contain in each issue facts and photographs of a specific manufacturer's advantageous application of a tangent bender. In this first issue, the actual production photographs and details of a tangent bender forming panels for frozen food cabinets are technically treated from a production increasing viewpoint. For your copy and all subsequent issues of "TBM", write on your letterhead to STRUTHERS WELLS CORP., Dept. 2, Titusville, Pa., or circle INFORM-A-GRAM Key No. B33.

"DELTA TOOLING TIPS", a publication recently issued by the Delta Mfg. Co., shows actual operation procedure photographs and gives descriptive text for drill presses, pedestal type grinders, and the Delta Unisaw. The "know-how" photographs in this bulletin are all from different manufacturers utilizing the Delta machines for production jobs, and the text describes how these specific applications minimized production problems. "Delta Tooling Tips" will be sent upon request from THE DELTA MFG. CO., Dept. 51, 600 E. Vienna Ave., Milwaukee 1, Wis., or circle INFORM-A-GRAM Key No. B34.

"FLEXIBLE SHAFT DRIVEN TOOLS AND EQUIPMENT" is the title of a 40-page reference catalog published by The S. S. White Dental Mfg. Co. on their Flexarms and parts, bench lathes, burs, separating discs, rotary files, and abrasive points, wheels and discs. Illustrations of all tools and "on-the-job" photographs plus uses and "know-how" on different applications for each tool combine to make this both a handy reference manual and tool procurement catalog. Complete specifications are also given. THE S. S. WHITE DENTAL MFG. CO., Industrial Div., Dept. 4, 10 East 40th St., New York, N. Y. INFORM-A-GRAM Key No. B35.

Again NEW, LOWER PRICES FOR LEMPCO ANTI-FRICTION DIE SETS

This third recent major price reduction is a prompt reflection of lower manufacturing costs.

Your enthusiastic acceptance of Lempco Anti-Friction Die Sets has allowed us to step-up production schedules and add more time-saving machine tools. We've been able to cut costs on our latest model—and, in the American tradition, pass our savings along to you.

The new Lempco *Precision* Die Set gives you all the advantages of anti-friction construction: increased die life . . . faster, more accurate production . . . greater economy.

Write today for your new price list and specifications for Lempco *Precision* and *Super-Precision* Anti-Friction Die Sets. At their new, lower prices, Lempco Precision Anti-Friction Die Sets are more than ever the best value your dollar can buy.

Licensed under the inventions of Guy Connor.

Preloaded anti-friction bearings between leader pins and bushings hold punches and dies in perfect alignment. And, they allow sets to open and close freely and easily . . . save assembly and try-out time . . . cut costly downtime.

LEMPCO 5713 DUNHAM ROAD • BEDFORD, OHIO

DRILL JIG BUSHINGS

Accurate
Interchangeable
Concentric

Acme Industrial Company

WRITE FOR FREE CATALOG

206 N. LAFLIN STREET, CHICAGO 7, ILLINOIS

SEE ADVERTISERS INDEX, PAGE 83, FOR KEY NUMBERS

PUBLICATION PREVIEWS

INCORPORATING TWO IMPORTANT IMPROVEMENTS in air gage design, point-to-point gaging and balanced air, the new line of Merz "New-Matic" Measuring Machines increases speed and accuracy of many inspection operations. This exclusive "New-Matic" principle of air gage operation, technically explained in a 20-page booklet from Merz Engineering Co., is included on five models for all types of inspection requirements, as well as on taper gages which check both taper and out-of-roundness in a single operation. Obtain this high-speed precision gaging booklet from MERZ ENGINEERING CO., Dept. 7-20, 200 S. Harding St., Indianapolis 7, Ind., or circle INFORM-A-GRAM Key No. B20.

FIRE INSULATING BRICK, 2½"x4"x8", that is half the weight of a standard fire brick and has a high degree of insulation because of its porosity and lightness is completely described in literature issued by Welding Equipment & Supply Co. This brick is a maze of trapped air cells, each one of which is a fortification against heat conductivity. This Eureka brick can be sawed, its ease of handling reduces labor expense, and the fuel it saves is greater than the cost of the bricks themselves. A sample brick and literature are available from WELDING EQUIPMENT & SUPPLY CO., Dept. 5-80, 223 Leib St., Detroit 7, Mich., or circle INFORM-A-GRAM Key No. B21.

ALL THREE TYPES OF BURS, the ground high-speed steel bur, the ground carbide bur and the file cut bur, are illustrated (some in action photographs) and given know-how explanations as to method of manufacture and correct operating procedure in the new 40-page "Keller Burs" catalog issued by Pratt & Whitney. In addition to the coverage of standard burs, this useful reference catalog also gives data on sanding and polishing drums, abrasive belts, sanding pads and discs, and 18 different grinding arbors. Request a copy from PRATT & WHITNEY, DIV. NILES-BEMENT- or circle INFORM-A-GRAM Key No. B22.

A STOP-OFF LACQUER DEVELOPED FROM NEW SYNTHETIC RESINS and called "Miccrostop", that makes possible fine hairline demarcation in masking parts prior to selective plating, is described in new literature issued by Michigan Chrome & Chemical Co. Adhesive qualities of Miccrostop will hold to a fine degree of accuracy through boiling cleaners, acid rinses and all selective plating cycles, and it may be applied by brush, dip or spray and is easily removed after plating. Literature and samples of Miccrostop are available from MICHIGAN CHROME & CHEMICAL CO., Dept. 9-97, 6340 Iefferson Ave., Detroit 7, Mich., or circle INFORM-A-GRAM Key No. B23.

MOVING, LIFTING AND LOWERING DIES, supporting overhanging work, transferring heavy materials, and loading and unloading trucks with Montgomery & Company Die Lifts are a few operations listed for these machines in the company's new four-page illustrated brochure. Photographs of three different types of Di-Lifts, A, B and C, show their construction, versatility and method of operation as well as their labor and time saving advantages. Complete specifications are also given. A copy of this brochure may be obtained by writing MONTGOMERY & CO., Machine Tools Accessories Div., Dept. 89, 53 Park Place, New York 7, N. Y., or circle INFORM-A-GRAM Key No. B24.

TOOLING RECOMMENDATIONS for the production of involute splines in accordance with the recently adopted ASA Standards for Involute Splines are thoroughly treated in a booklet published by Illinois Tool Works. The booklet deals mostly with the basic principles involved in tooling for the manufacture of various types of involute splines and specifies proper hobs, shaper cutters and broaches for producing each type. Copies of the booklet are available on request. Address ILLINOIS TOOL WORKS, Dept. 8-30, 2501 N. Keeler Ave., Chicago 30, Ill., or circle INFORM-A-GRAM Key No. B25.

SUGGESTIONS TO PURCHASER AND DESIGNER on drill jig bushings contained in an eight-page bulletin just released by Ex-Cell-O Corporation include important data on the advantages obtained from the use of the right bushing in the right place. Schematic diagrams, prices and ordering information, and special notes on each page of this bushing reference bulletin furnish additional pertinent know-how on fixed renewable, slip renewable, headless liners, head press fit and headless press fit bushings. Address your request to EX-CELL-O CORP., Dept. 7-37, 1200 Oakman Blvd., Detroit 6, Mich., or circle INFORM-A-Gram Key No. B26.

NEW COOLANT FOR HIGH SPEED PRODUCTION ON TOUGH ALLOYS called Lusol, a liquid concentrate used with 10-75 parts of water, has just been announced in literature from Anderson Oil Co., Inc. Production tests of this new coolant are comprehensively explained to show that under actual operating conditions Lusol increases production rate, gives tools longer life, holds closer tolerances, produces cooler and cleaner work, and is easier to handle without harmful effects to operator. Also thoroughly covered are how Lusol makes a true solution, not an emulsion, and how it does not evaporate or become rancid. This informative literature is available by writing ANDERSON OIL CO., INC., Dept. 28, 537 Brownstone Ave., Portland, Conn., or circle INFORM-A-GRAM Key No. B27.

Stampings ANY SIZE—
ANY SHAPE—MADE
QUICKLY AND ECONOMICALLY

H P L Manufacturing Company, through an exclusive process, is taking orders in quantities of twenty-five pieces and up for blanking, piercing, forming, tapping, countersinking, extruding, stenciling and similar operations on cold, punchable material.
The H P L process assures fast, accurate, dependable work at low tool cost. It is flexible to change in design yet maintains the closest tolerances and exact duplication. *For Further Information Write to Dept. 71.*

HPL *Manufacturing Co.*
2013 E. 65th ST., CLEVELAND 3, OHIO

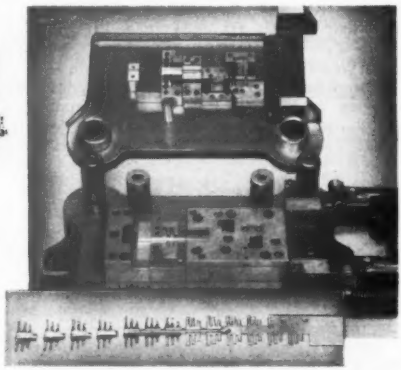
STAMPINGS IN SMALL LOTS

FEDERAL FACILITIES

Quality Tools such as this die, reduce production costs by combining many operations in a single tool.

Federal equipment, with latest modern techniques and skilled personnel are available for building all types of Dies, Jigs, Fixtures, Molds and Special Tools.

Let us quote on your tooling requirements.



A Combination of Forming and Twisting Operations Not Usually Obtained in a Single Die. Entirely Automatic, Feeding at the Rate of 100 Pieces Per Minute.

FEDERAL TOOL CORPORATION
401 N. Leavitt St., Chicago 12, Ill.

SEE ADVERTISERS INDEX, PAGE 83, FOR KEY NUMBERS

PUBLICATION PREVIEWS

AIR CYLINDERS FROM 1½" TO 14" BORES, single and double rod end non-rotating types, are shown with and without cushions and with a choice of standard and many oversize piston rod diameters in a new eight-page catalog from Miller Motor Co. Full mounting dimensions and installation drawings are presented on 16 models of double acting and single acting cylinders, with and without spring return. In addition an insert in handy form, prepared by Miller's engineering department, contains copyrighted tables which show thrust developed and consumption of cylinders, capacities and pressure losses in pipes and fittings, and piston rod column strength. Request this catalog and group of tables from MILLER MOTOR CO., Dept. 79, 4029 N. Kedzie Ave., Chicago 18, Ill., or circle INFORM-A-GRAM Key No. B56.

"FOUR NEW SERIES OF HOUGHTON'S CUTTING OILS" is the title of an illustrated four-page folder from E. F. Houghton & Co. This revised lineup points out the physical properties of the improved CUT-MAX 100, 200, 300 and 400 series of cutting oils. The folder also tells how the four distinct series, each including a full range of required viscosities, provide the user with a superior coolant for any machining operation. For further information write for Folder 2-414 to E. F. HOUGHTON & CO., Dept. 3-24, 303 W. Lehigh Ave., Philadelphia 33, Pa., or circle INFORM-A-GRAM Key No. B57.

SAW BULLETIN NO. 107, just released by Chicago Saw Works, has been compiled to provide a convenient guide in determining which type and size of circular saw to use for a particular job. This bulletin illustrates and describes many types of saws and circular knives, as well as saws actually being made. The entire Chicago line, presented in this bulletin, includes cross-cut, rip, cut-off, planer, mitre, combination, soft-metal, friction and special saws, dado heads and knives. For your copy of this convenient saw guide address CHICAGO SAW WORKS, Dept. 64, 5042 S. Wentworth Ave., Chicago 9, Ill., or circle INFORM-A-GRAM Key No. B58.

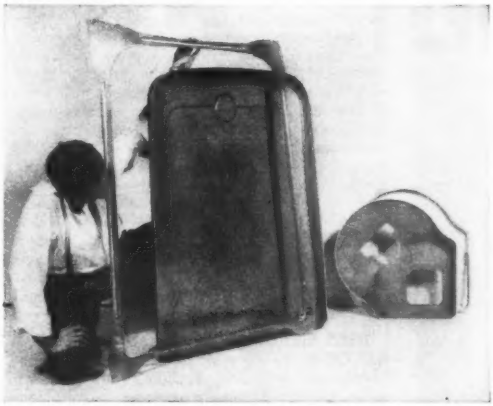
THE COMPLETE LINE OF HOBART "SIMPLIFIED" ARC WELDERS is completely illustrated and described in a new 36-page catalog from The Hobart Brothers Co. Electric arc welders in the motor driven dc type, five sizes from 150 to 600 amperes; gasoline engine driven welders in four sizes from 200 to 600 amperes; ac transformer type welders in three sizes from 200 to 500 amperes; welding generators only in four sizes from 150 to 400 amperes, and other models in all sizes for special arc welding applications are covered by complete dimensions and specifications. Various features comprising the machines are individually illustrated and described, and helpful information is given for various welding problems. Request your copy from THE HOBART BROTHERS CO., Dept. 3, Hobart Square, Troy 1, Ohio, or circle INFORM-A-GRAM Key No. B59.

MOORE AIR GAGES are comprehensively described as well as illustrated by photographs and schematic diagrams in a new 28-page catalog just released by Moore Products Co. Complete in all phases of air gaging, this informative catalog covers economic and application data, gives the principles of operation, features, and calibrations for each of the three types of equipment. The three types are: type C, has adjustable amplification and calibrated dials for ranges of 0.002" and less; type R, adjustable amplification and calibrated dials for ranges of 0.002" and more; and type F, with fixed amplification, dials uncalibrated. The specification information shows standard clearances and wear allowances of standard pneumatic members for measuring id and od. Write to MOORE PRODUCTS CO., Dept. T, H & Lycoming St., Philadelphia 23, Pa., or circle INFORM-A-GRAM Key No. B60.

McGILL CARBIDE TOOL COMPANY ORGANIZED. Charles C. McGill, for many years connected with one of the leading fabricators of tungsten carbide tools, has just announced the formation of a new company to be known as McGill Carbide Tool Co. Mr. McGill is well qualified to supply fine tungsten carbide tipped tools, both in standard sizes and for special applications, and can furnish tools using any specified tungsten carbide metal, to meet any demand by industry. Catalog 107, now available, covers McGill's complete line. Request a copy from McGILL CARBIDE TOOL CO., Dept. 65, 4612 Woodward Ave., Detroit 1, Mich., or circle INFORM-A-GRAM Key No. B61.

STANDARD BRONZE BEARINGS, BRONZE BARS AND BRONZE ELECTRIC MOTOR BEARINGS, also complete listings of new bar sizes, new standard stock sizes, and new electric motor bearing sizes, are comprehensively treated in a new catalog from The Bunting Brass & Bronze Co. In addition it describes by text and drawings special bearings which Bunting manufactures to customers' blueprint specifications. A valuable section is also given on cast bearing bronze, covering the installation of bearings, recommended table of press fits, instructions for grooving and for selecting the proper type of groove, and typical housing and lubrication designs for sleeve bearings. Instructions are also given for grinding tools to machine cast bearing bronze. Request this catalog from THE BUNTING BRASS & BRONZE CO., Dept. 56, 715 Spencer St., Toledo 9, Ohio, or circle INFORM-A-GRAM Key No. B62.

SHELLS TRIMMED IN ONE OPERATION OF A PUNCH PRESS



with a

BREHM

TRIMMING DIE

(The Shimmy Die)

● Trims straight edges or edges with notches or projections. One die can trim a variety of shell sizes. Have trimmed .005 in. brass up to .218 in. steel. Trims handled range from small round ferrules and women's wrist watch cases to beer barrels and refrigerator doors.

Write for booklet or send prints for quotations.

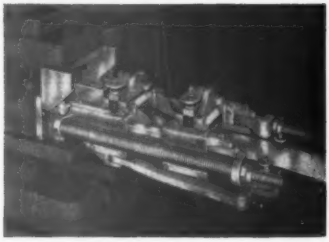
THE STEEL PRODUCTS ENGINEERING CO.

1211 W. Columbia St. Springfield, Ohio

Always Specify **DICKERMAN DIE FEEDS**

for **PUNCH PRESS** *Profits*

- Simple design; easy to install
- Low in cost; extremely accurate
- Reliable, automatic operation
- Reduce fatigue of operators
- Sizes and types for all needs



Write for illustrated circular, or
***Call* EXpress 1133**

THE DIE SUPPLY CO.

"STANDARD" DIE SETS • SOCKET SCREWS • DIE SPRINGS
DOWEL PINS • CERRO ALLOYS • DE-STA-CO TOGGLE CLAMPS
COMPLETE STOCKS FOR IMMEDIATE DELIVERY
5349 St. Clair Avenue Cleveland 14, Ohio

SEE ADVERTISERS INDEX, PAGE 83, FOR KEY NUMBERS

HALLER MODEL D-600 HYDRAULIC STOCK FEED, Model D-610 stock straightener, and Model D-611 scrap cutter, for use on punch presses with all stock up to $\frac{3}{32}$" thickness and

4" width, are fully described and illustrated in a new bulletin from Haller Machine & Mfg. Co., Inc. This four-page bulletin with two-page insert covers each unit in detail. Controls and adjustments are identified and operating features are explained in full. Complete specifications are also included. Copies of the bulletin are available on request from HALLER MACHINE & MFG. CO., INC., Dept. 36, 7940 Tireman Ave., Detroit 4, Mich. INFORM-A-GRAM Key No. B50.

TYPE MR 3 FINE SILVER POWDER, a chemically precipitated, white in color, free flowing, and an unusually high pure powder (99.97+%), is described in new literature from Alloymet Mfg. Co. How it contains no free acids or alkalies and is gas free; how the grains are in a fully annealed condition; and how these particles are very irregular in shape, possessing many hooks and arms which produce an interlocking effect upon pressing, are all comprehensively explained. Also how the lack of micron size particles minimizes the loss of powder through dusting during the pressing operation is treated. Request this literature and details from ALLOYMET MFG. CO., Dept. 5, 3 Grand Street Extension, Brooklyn 11, N. Y., or circle INFORM-A-GRAM Key No. B51.

UNBREAKABLE, NON-CORROSIVE, LEAK-PROOF SILVER SOLDER JOINTS, which are actually stronger than the metal itself, are described and illustrated in new literature from American Products Corp. The "Silver Solder Brazing Kit", which includes all necessary equipment and materials for brazing, is completely covered in this new literature. This method of brazing compares favorably with acetylene torch brazing for light bench work on metals up to ¼" thickness. The outfit includes an improved type alcohol torch, fuel, heat retaining chamber, accessories, instructions for use, and a hand silver solder supply kit. A tube of superior flux paste, 100 inches of assorted sizes of silver solder wire, and a one-inch wide strip sheet are contained in the supply kit. All are packed in a self-contained permanent case. Entire weight is only three pounds. Request details from AMERICAN PRODUCTS CORP., Dept. 61, 802-39 Lowell Bldg., Chicago 5, Ill., or circle INFORM-A-GRAM Key No. B52.

USED EITHER AS A BAR MACHINE OR A CHUCKER, the new Model AB 2½" Cleveland "Dialmatic"—a single-spindle, five hole turret automatic, equipped with an electric feed drive—featuring unique improvements which result in higher production at lower cost, is illustrated and described in a six-page bulletin from The Cleveland Automatic Machine Co. The machine and its components, including the electric feed drive, universal camming, feed bracket, tool turret, spindle and head, and main drive, etc., are thoroughly treated from an engineering viewpoint. Complete specifications are also given. THE CLEVELAND AUTOMATIC MACHINE CO., Dept. 2-38, 4924 Beech St., Cincinnati 12, Ohio, or circle INFORM-A-GRAM Key No. B53.

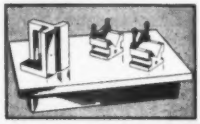
MAGNESIUM, THE LIGHT-WEIGHT METAL for a multitude of uses, is technically and comprehensively treated in a new 20-page booklet issued by Revere Copper & Brass, Inc. The history of magnesium, what it is, the way in which it may be utilized, and its future possibilities are clearly defined and given in contrast to its performance record so that "what it will do" and "its unlimited applications" are readily recognized. Numerous drawings of its possible applications are also shown. For your copy of this magnesium booklet address REVERE COPPER & BRASS, INC., Dept. 94, 230 Park Ave., New York 17, N. Y., or circle INFORM-A-GRAM Key No. B54.

A NEW PRECISION SURFACE GRINDER, with a variable speed table adjustable from 12 to 35 fpm, is illustrated and described in a bulletin just released by Reid Brothers, Inc. Photographs of the grinder, its components, and the accompanying text show how this machine operates and how the variable table speed works in handling various types of materials. A copy of this bulletin will be sent upon request from REID BROTHERS, INC., Dept. 38, 140 Elliott St., Beverly, Mass., or circle INFORM-A-GRAM Key No. B55.

SOUTH BEND

NEW SURFACE PLATE, V-BLOCKS, ANGLE PLATE

SURFACE PLATE for checking, laying out, etc. Precision ground to .001". 12" x 17" x 3", top 3/4" thick . $37.50



V-BLOCKS for holding cylindrical parts. Precision ground. 1-15/16" x 2-15/16" x 2-1/4". Cap. 1/4" to 2". Per matched pair . . $32.00

ANGLE PLATE. Precision ground. 3-1/4" x 3-1/4" x 4-1/4" $20.00

SOUTH BEND LATHE WORKS 432A E. Madison St. South Bend 22, Ind.

CLEVELAND INDEXING HEAD

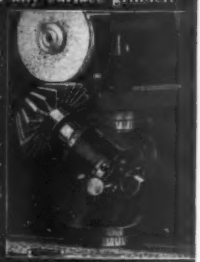
Regrind all straight or taper shank tools from 1/8" to 1 1/2" diameter in your own shop . . . on any surface grinder.

•

Rotates 360° in three planes on a common center.

•

Automatic Indexing Gear for re-establishing concentricity.



Write for Catalog 464 . . . Today

GRINDERS & FIXTURES, Inc.

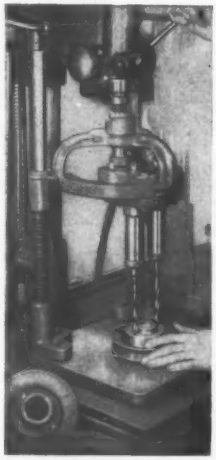
8327 Clinton Rd. - CLEVELAND 9, OHIO

LINDERME

USERS SAY:

Production UP . . .

Costs DOWN!



2 HOLES• 1 STROKE

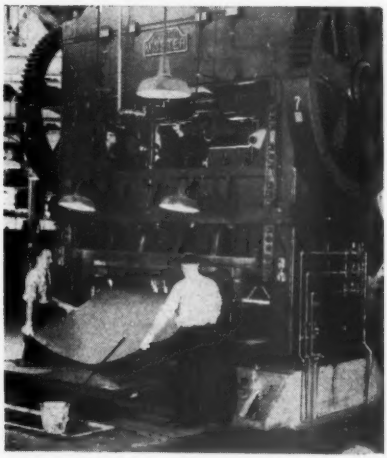
That's simple arithmetic with a LINDERME Two Spindle Drill Head on the job. Here's an adjustable precision drill head *low* in price, *high* in productivity. The versatility of this attachment makes it a gold mine in any shop. Linderme Drill Head users in general and production machine shops, plastics fabricators and others report great savings from a low initial investment . . . It's quickly set to variable centers from ½ to 6", drill capacity up to ⅝", adaptable to various tapping units. Models A and B for sleeve adaptation to drill press quills; Models C and D with "over-arm" arrangement, guide pins, springs and brackets mounted on heavy ground base for use with drill fixtures.

Write for Bulletin containing complete details.

LINDERME
MACHINE & TOOL CO., INC.
12250 COYLE AVENUE
DETROIT 27, MICHIGAN

SEE ADVERTISERS INDEX, PAGE 83, FOR KEY NUMBERS

IS YOUR PRESS WORK STRENUOUS?



STRENES METAL cast dies are the right tools for severe drawing and forming jobs—large stampings like airplane propeller blades . . . heavy stampings like wheel rims and tractor seats.

The users of ***STRENES METAL*** dies include manufacturers of appliances, airplane parts, automobiles, trucks, tractors, burial caskets and vaults, implements, blowers, etc. Since many of the stampings are extremely large, ***STRENES METAL*** dies frequently weigh in excess of 10,000 lbs.—sometimes as much as 25 tons.

Whatever your drawing and forming problems may be, put them up to us. It will pay you.

THE ADVANCE FOUNDRY CO.

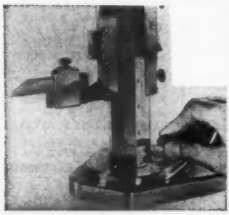
111 SEMINARY AVENUE

DAYTON 3, OHIO

Strenes Metal

DRAWING AND FORMING DIES

SCHERR *aids to precision – production*



CHESTERMAN HEIGHT GAGE

A big, sturdy, stabilized instrument which can double the output of your skilled toolmakers. Fine adjustment by screw operated from knurled nut on base eliminates all chance of rocking or shifting instrument while measuring. Split nut for rapid up or down adjustment of the head. 2½" long vernier in place of the normal ¾" vernier provides greater visibility without the need of magnifier or removing gage from work. Both English and metric readings one on each face of column. Made in sizes from 12" to 48"—capacities sufficient for the most unusual measurements.

OPTI-FLAT GLASS SURFACE PLATE

Here is the basis for vertical measuring accuracy—on optically ground glass surface, flat within 50 millionths over the total area. A solid, non-warping, thick disc of Pyrex brand glass, set in a heavy wood base with dust-proof cover. Immune to the internal strains which may affect the accuracy of metal surface plates, with the added advantage that accidental scratches cannot cause raised burrs, nor too long usage wear the hard surface. For real accuracy in layout work and critical inspection, start from the perfect surface of a Scherr Opti-Flat. Two sizes—12" diam., 2" thick, $58 and 16" diam., 3" thick, $88. Also a complete stock of hand-scraped metal surface plates, angle irons, measuring irons, etc.

ULTRA-CHEX GAGE BLOCKS

The last word in modern basic accuracy brought within the grasp of all shops large and small. Sets in sizes for all budgets. All blocks accurate to five millionths. Illustrated is the 34-block set, giving 80,000 combinations in steps of 1/10,000" with optical flat for checking wear. Low prices allow for constant practical shop use in setting tools, checking gages, locating holes in jigs and fixtures, etc. Many shops use a number of sets, with one master set for reference. Set shown, $125.

Write for full details on these tools, and for the Scherr Small Tool Catalog.

GEO. SCHERR CO., Inc.

197-A Lafayette St. New York 12, N.Y.

PLEASE USE INFORM-A-GRAM FOR PRODUCT INFORMATION

High Speed Grinder 18,000 R.P.M.!

It's new!

it's the Haskins

VB-2!

Haskins VB-2 High Speed Grinder

THIS new Haskins high-speed grinder answers the need for a flexible shaft machine that has the speed and power to operate small grinding wheels and carbide rotary cutters efficiently. Designed for both bench and suspended use, the new VB-2 has a high-speed, cool-running flexible shaft and ball-bearing collet-type spindle—develops 18,000 r.p.m. free speed—makes cutting wheels and tools last longer. Find out today why it is becoming an indispensable tool for general light production work. Write for details.

R. G. Haskins, 2651 W. Harrison Ave., Chicago 12, Ill.

haskins

FLEXIBLE SHAFT EQUIPMENT

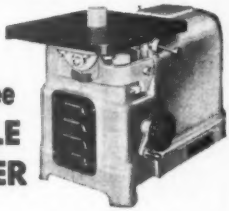
2 MACHINES that You NEED

. . . for a Full Range of Tool - Die - and Machine-Shop Work

The Milwaukee DIE FILER

— does a precision job of straight-line, sharp-corner filing, sawing and lapping . . . especially in the softer metals prior to hardening. It is widely used in making dies, tools, jigs, fixtures and templates. Sturdily constructed, simple in adjustment and operation. Saw overarm quickly attached.

The Milwaukee PROFILE GRINDER



— is especially adapted to precision grinding of curved and irregular profiles, both internal and external. It supplements the work of sawing and filing machines, is especially valuable in the finish-grinding of hardened steel parts for tools, dies, jigs and fixtures.

Both Machines are Stocked and Sold by Industrial Machinery and Mill Supply Distributors. Write for Illustrated Bulletins.

RICE PUMP & MACHINE CO.

Division Milwaukee Chaplet & Mfg. Co.

1029 S. 40th STREET, MILWAUKEE 4, WIS.

MILWAUKEE

DIE FILERS · PROFILE GRINDERS

SEE ADVERTISERS INDEX, PAGE 83, FOR KEY NUMBERS

CAST IRON HAND KNOBS for Tools and Machinery up to 300% saving

You can't afford to substitute makeshift knobs when you can purchase these knobs for immediate delivery at such low cost—

¾"	...$ .06 each	2"	.....$ .17 each
1⅛"	... .08 each	2½"	... .25 each
1½"	... .10 each	3"	..... .30 each

Prices are F.O.B. Cleveland

Order A Stock for Your Tool Room. MINIMUM ORDER—$2.00. Take advantage of liberal quantity discounts starting at 25 pieces of a size.

IMMEDIATE DELIVERY

Write for Catalogue No. 2

BUB

GEORGE F. BUB & SON

11414 Madison Avenue
Cleveland 2, Ohio

Dealer Inquiries Invited

DIAMOND WHEELS REQUIRE CORRECT LUBRICATION

AMAZING TOOL FINISHES ON THE CARBIDES IS POSSIBLE WITH

Stadoil

DIAMOND LAPPING OIL

The ONLY Lubricant designed to eliminate loading and glazing of diamond wheels and laps.

"Since 1935"

Order Thru Your NORTON or CARBOLOY Distributor

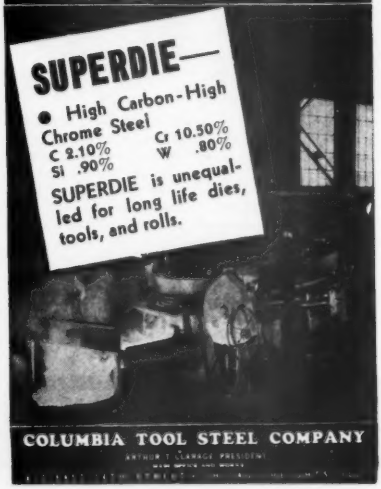
OR INQUIRE TO

STADOIL MANUFACTURING CO.

EL MONTE, CALIFORNIA

Manufacturers Stocks also in Los Angeles and Dallas, Texas

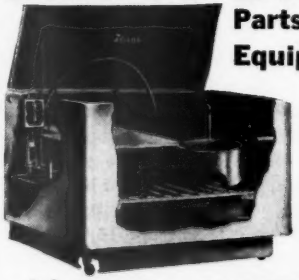
Columbia TOOL STEEL



COLUMBIA TOOL STEEL COMPANY

CLEAN DIES

Parts and Equipment



with a GRAY-MILLS **AGITOR**

COLD PARTS CLEANING SYSTEM

it's safe, efficient, clean, fast!

Every modern tool room needs an Agitor. 4-way action makes it easy to clean dies, tools, machine parts. Saves costly time; increases die life. Ask your industrial distributor for details or

Send for catalog to

GRAY-MILLS CORPORATION

1951 RIDGE AVENUE EVANSTON, ILLINOIS

PLEASE USE INFORM-A-GRAM FOR PRODUCT INFORMATION

C T&E C

PRECISION BROACHES

Manufacturers of standard and special broaches. A complete service for sharpening, reconditioning and converting broaches. Standard keyway broaches in stock.

Dependable—Prompt Service

CONANT
TOOL & ENGINEERING CO.
307 WEST 107TH STREET
CHICAGO 28, ILLINOIS

Heavy Duty • Bench Type
ENGRAVING MACHINE

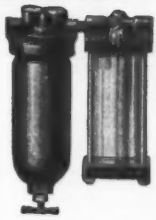
Interchangeable heads for engraving, electrical marking, and acid etching . . . available for all models. Also Panto engraving cutters, cutter grinders, master copy type, endless belts and accessories.

Catalog On Request

The PANTO MODEL UE-3
LIGHTER MODELS UE and UE-2

H. P. PREIS ENGRAVING MACHINE CO.
647 Route 29 • Hillside, N. J.

M·B AIR-LINE FILTER and AUTOMATIC LUBRICATOR



Removes 95% to 97% of All Water, Dirt and Scale from Airline.

Air passes through a series of brass discs with .002 spacings, providing the finest degree of filtration obtainable by any known method. Then, as the air passes through head of Lubricator, oil is delivered into the purified airline in any desired volume. Write for Literature.

Representatives in Principal Cities

M·B PRODUCTS
130-134 E. LARNED STREET
Detroit 26, Michigan

BAUMBACH

35 YEARS OF DIE SET MAKING

THE DIE-SET AUTHORITY

All Baumbach Die-Sets have demountable Leader Pins and Bushings. This exclusive feature permits removing leader pins for machine work on the die shoe and assures reassembly without loss of alignment. A big time and trouble saver. Write for Catalog.

E. A. BAUMBACH MFG. CO.
1814 S. KILBOURN AVE. CHICAGO 23, ILL.

SEE ADVERTISERS INDEX, PAGE 89, FOR KEY NUMBERS

MIRRORFINISHES

in Minutes instead of Hours

On Tungsten Carbide, Tool Steels, Special Steels, Chrome, etc.

WITH STAR DUST

Laboratory Graded

Pure Diamond Powders and Diamond LAPPING COMPOUND

Produces super-finishes and polishes down to less than a MICRO-INCH with INCREDIBLE SPEED.

Write us your lapping problems. No obligation.

ACE ABRASIVE LABORATORIES

1 SPRUCE STREET • NEW YORK 7, N. Y.

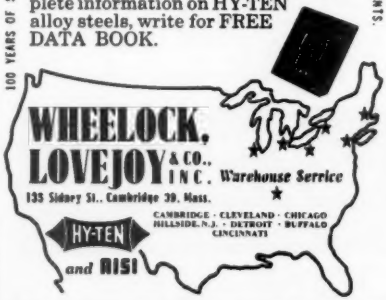
100 YEARS OF SERVICE: ROUNDS, SQUARES, FLATS, HEXAGONS, OCTAGONS, BILLETS AND FORGINGS FOR PRODUCTION, TOOL ROOM AND MAINTENANCE REQUIREMENTS.

TOOL & DIE MEN SPECIFY

HY-TEN

"M" TEMPER ALLOY STEEL

for maximum machinability and minimum heat-treat distortion. It has great toughness at high degrees of hardness and long-wearing properties for lowest unit cost. For complete information on HY-TEN alloy steels, write for FREE DATA BOOK.



WHEELOCK, LOVEJOY & CO., INC. *Warehouse Service*

135 Sidney St., Cambridge 39, Mass.

CAMBRIDGE · CLEVELAND · CHICAGO
HILLSIDE, N.J. · DETROIT · BUFFALO
CINCINNATI

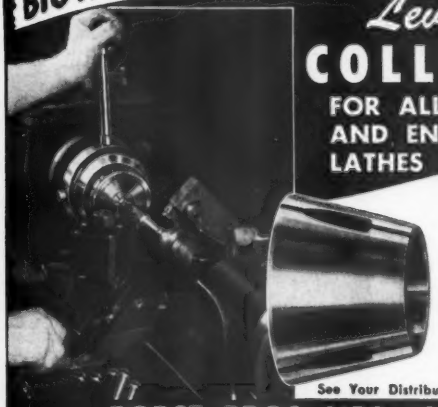
HY-TEN and RISI

BIG NEWS ANNOUNCING 1 1/2 INCH CAPACITY

Levermatic

COLLET CHUCK

FOR ALL TURRET AND ENGINE LATHES



Added to
THE OVERWHELMINGLY APPROVED 1-INCH SIZE RECENTLY INTRODUCED

PROVED STEPPED UP PRODUCTION 50 TO 100%

- **Assures greater speed and accuracy**
- **Stronger, more positive work grip**
- **Maximum ease of operation**
- **Simple finger-tip adjustment**

See Your Distributor or Write for Catalog

PORST BROS MFG. CO. 257 N. California Ave. Chicago 12, Illinois

Manufacturers of Collets and Fingers for 25 Years

West Coast Office: PORST SALES, 132 W. Union St., Pasadena 1, Calif.

PLEASE USE INFORM-A-GRAM FOR PRODUCT INFORMATION

LASSY TAPPER & THREADER

"It Measures as it Taps"

The only machine with patented depth gauge

TAP SAVER DEPTH GAUGE

tells exactly how far tap has travelled. Prevents broken taps. Single hollow spindle for sensitive work.

Tap adapters for instant tap changes.
Stepped holding bars take place of vise.
Send for details of this new low-priced machine.

LASSY TOOL COMPANY
96 Bohemia St. Plainville, Conn.
Makers of Lassy Floor Tappers & Tap Guides

Miccro Supreme
LAY-OUT AND IDENTIFICATION DYE

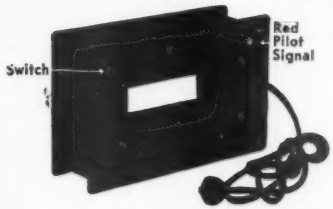
12 COLORS*

For Tool, Die, Pattern or Template layout on metal . . . Quick identification of stock and parts . . . Shows up in sharp relief—dries instantly—easily removed . . . Write for circular.

**Purple shipped unless otherwise specified*

MICHIGAN CHROME & CHEMICAL COMPANY
6340 E. Jefferson Ave. • Detroit 7, Mich.

Save TOOLS • TIME • LABOR
with the Improved • AMC • DEMAGNETIZER



No shop or toolroom can afford to be without one. Thoroughness of the AMC Demagnetizer will give greater precision to finished parts.

One pass through AMC Demagnetizer removes all magnetism from processed parts. Large flat surfaces are demagnetized by sliding unit over surface.

● **Our AMC Demagnetizer will pay for itself in a few weeks. Standard units available, and special sizes to order.**

▶ *Write today for illustrated circular.* ◀

ALOFS MFG. CO.
1619 Madison Grand Rapids, Mich.

SEE ADVERTISERS INDEX, PAGE 93, FOR KEY NUMBERS

Classified Advertising

FOR SALE · WANTED · EMPLOYMENT OPPORTUNITIES

RATES—$2.00 SERVICE CHARGE PLUS 15¢ PER WORD—PAYABLE IN ADVANCE

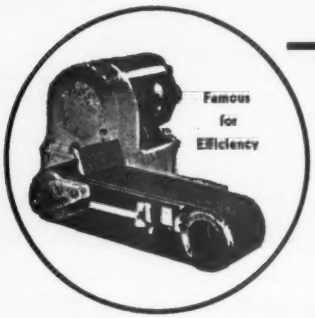
★ ★

MANUFACTURERS' AGENT
Contacts larger Industrial Plants and Machine Shops in Southern California. Desires additional lines for representation. Address Box LC-548, TOOL & DIE JOURNAL, 1975 Lee Road, Cleveland 18, Ohio.

FACTORY MANAGER or Superintendent experienced in building tools, dies and special machinery. Old established successful concern with brilliant future. Applicant to invest in firm and serve on Board of Directors. Unusual opportunity. Address Box AP-548, TOOL & DIE JOURNAL, 1975 Lee Road, Cleveland 18, Ohio.

ESTIMATOR experienced in tool, die and special machine work. Prefer man willing to invest in well established and promising firm. An opportunity of great potential. Address Box OW-548, TOOL & DIE JOURNAL, 1975 Lee Road, Cleveland 18, Ohio.

SALES REPRESENTATIVE WANTED by manufacturer of the finest Die Sets on the market today. Territories available in all sections of United States and Canada. Must be acquainted with die work and have large acquaintance in their territories in this particular field. Commission basis. Address Box AM-548, TOOL & DIE JOURNAL, 1975 Lee Road, Cleveland 18, Ohio.



• *HIGH SPEED GRINDING* •

STANDARD D-4 **ABRASIVE BAND GRINDER**

This new, streamlined bench type grinder assures fast, quality finishing on metals, plastics, wood, fibre . . . at low cost. Built to machine tool specifications, Standard D-4 is equipped with improved band tension control and specially designed protective motor hood. 4x36¼" band. The ideal portable unit!

Other styles and sizes in New Manual on Finishing — Write Today

WALLS SALES CORP.
306 E. 138th Street New York, N. Y.

As Every Machinist Knows
IT PAYS to REDUCE TAP BREAKAGE

The DAHLSTROM TAP GUIDE does the job in a fraction of the time required for hand tapping. Because the work is dependably straight and square, tap breakage is practically eliminated—and gone are the hours wasted prying broken taps out of dies. Equipped with seven adaptors, ranging from 5/32 to ½", it takes care of 95% of all tapping requirements. Taps not furnished. Dahlstrom Manufacturing Co., 422 South Sixth St., Minneapolis 15, Minn. *$52.50 F.O.B. Minneapolis.* Circular on request.

Dahlstrom **TAP GUIDE**

- 12" x 6" x 14"
- Fastens to wall or bench
- Anyone can operate it

"HI-ROCKWELL" DRILLS!

They drill steels with Rockwell Hardness of C35 to C70.

—●—

If it's steel—"HI-ROCKWELL" Drills will cut it clean no matter how hard.

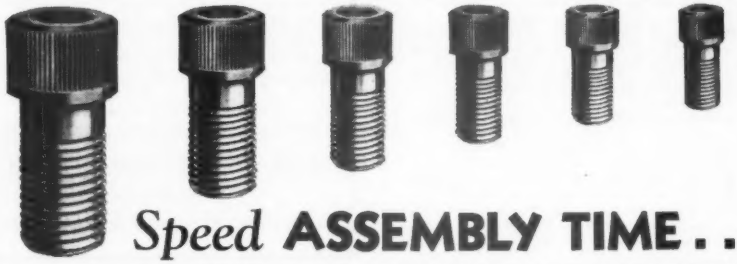
RAY-METAL Co.
RIGID-CARBIDE-TOOLS

Walled Lake, Michigan

Accurate Hole Transfer Made Easy With NIELSEN TRANSFER SCREWS

Simply insert in holes, invert, strike sharply and you have centers and drill circles perfectly located. Reduce time and eliminate spoilage of other methods. 7 sizes U.S.S. Inexpensive — Last for years. Write for Circular.

NIELSEN TOOL & DIE COMPANY
1986 W. Eleven Mile Rd.
Berkley, Mich.



Speed ASSEMBLY TIME . .

UNBRAKO KNURLED HEAD CAP SCREWS

Reg. U. S. Pat. Off.

Knurling of Socket Screws originated with "Unbrako" in 1934.

. . . they *speed* assembly time because their knurled heads provide a slip-proof grip—even though the fingers and heads are oily; therefore, they can be screwed-in faster and farther before a wrench becomes necessary . . . and the Knurled Head, where used, also helps to "doll-up" the looks. Their Internal Wrenching feature facilitates compact designs, thus space and weight are saved and costs reduced. Millions upon millions of these time-savers,—in sizes from No. 4 to 1½" diameter and in a full range of lengths,—are being widely used throughout industry. Ask for the "Unbrako" Catalog.

Ask for the name and address of your nearest "Unbrako" Distributor

OVER 45 YEARS IN BUSINESS

STANDARD PRESSED STEEL CO.

Jenkintown, Penna., Box 600 • Branches: Boston • Chicago • Detroit • Indianapolis • St. Louis • San Francisco

SOUTH BEND

LATHE CENTERS and DRILL PADS

Description	No. 2 Taper	No. 3 Taper
L—SCREW CENTER	$3.00	$3.25
G—DRILL PAD	2.50	2.75
H—CROTCH CENTER	2.50	3.25
J—HOLLOW CENTER, 60°	2.00	2.75
I—60° CENTER	2.25	3.00
P—CARBIDE TIPPED CENTER	4.50	8.00
Q—HALF CENTER	2.25	3.00
N—CUP CENTER	2.00	2.75
M—SPUR CENTER	3.00	3.25

SOUTH BEND LATHE WORKS 432A E. Madison St. South Bend 22, Ind.

THE HABIT OF PRECISION

● Established over a half-century ago to design and build fine surveying instruments *that had to be accurate*, The J. C. Ulmer Company has always made precision a *habit*.

Today this Ulmer habit of Precision Service is paying dividends to many of the outstanding industrial plants of America in the unsurpassed performance of their Ulmer-built tools, gages, jigs, fixtures and special machines.

Write today for our new folder, "Precision Service,"

THE J. C. ULMER COMPANY

The Habit of Precision Since 1893

1791 East 38th Street • Cleveland 14, Ohio

SCHAFFER LOAD EYE BOLTS

CENTERING EYE BOLTS

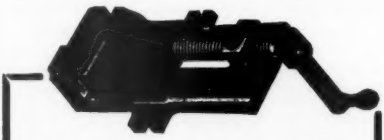
SCHAFFER EYE BOLT — OLD EYE BOLT

★ Carries ten times the load of ordinary Eye Bolt . . . Because it lifts in line with the load!
★ Prevents costly damage to machinery, etc., caused by standard eye bolts shearing off.
★ Built to last a lifetime.
★ Parts are easily replaceable.
★ Made of high grade steel . . . whose ductility and toughness is greater than ordinary Commercial Steel . . . therefore, SCHAFFER EYE BOLTS can be subjected to heavy intermittent strains and jerks.
★ Replaceable Bolts . . . for extra long life.
Price—7/16" to ¾"—$ 6.50 each
⅞" to 1½"—$13.00 each

When ordering specify amount and size.

S. S. SCHAFFER COMPANY

1846 East 57th Street
Los Angeles 11, California



YOST DRILL PRESS VISE

This new Yost vise has been designed expressly for use on drill press operations. Does away with special and costly jig fixtures.

Offered in two sizes

Vise No.	Width of Jaw, Inches	Opens Inches	Weight Pounds
1D	3½	4	12½
2D	5	5½	25

Do you need a vise of ANY type?

Write today for bulletin on the extensive Yost line

YOST MFG. COMPANY
1000 MAIN STREET
MEADVILLE, PENNSYLVANIA

CUT ANY SHAPE CLEVERLY with a BEVERLY SHEAR

Regardless the shearing job, straight or irregular, you can do it faster—better with a BEVERLY Throatless Bench Type Shear. Comes in 4 sizes . . .

No. B1—cuts 14 gage—weight 13 lbs.
No. B2—cuts 10 gage—weight 35 lbs.
New Junior—cuts 18 gage, weighs 6 lbs. Stands available for all sizes of Beverly's Shears.
No. B3—(Equipped with ball-bearing holddown device)—cuts 3/16 inch mild steel or 10 gage stainless, wt. 58 lbs.

THE BEVERLY SHEAR MFG. CO., 3008 W. 111th ST., CHICAGO 43, ILL. DEPT. 7

DRILL THESE HOLES

BY A QUICK, EASY, INEXPENSIVE METHOD

Your business letterhead will bring literature.

WATTS BROS. TOOL WORKS
Wilmerding, Penna.

WAKCO WEIGHT RULE

enables you to calculate almost instantly the weight of a piece of metal in any size or shape. Covers aluminum, brass, cast iron, copper, lead, magnesium and steel, in balls, bars, cubes, fillets, hexagonal, octagonal, plates, prisms, pyramids, ½ round, ¼ round, round, wedges, etc. Rule made with all-white plastic with markings protected by overlamination of clear plastic. RULE in case with Instruction Manual $15.50

WARREN-KNIGHT CO.
139½ N. 12th St., Phila. 7, Pa.

Fast **Accurate Measurements**

with the *NEW* AMIC

QUICK ACTION
VERNIER CALIPER
Stainless Steel

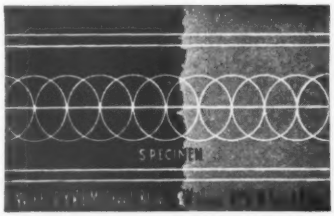
THE PERFECT TOOL for machine shop, toolroom, inspection and quality control, etc.

A flick of the thumb and you've got your external and internal dimensions. Knife-edged, hardened jaws provide exact thread measurements. A depth gage blade gives speedy depth measurements. Made of stainless steel; packed in a sturdy leatherette case. Scientifically engineered, painstakingly machined and AMERICAN made, the AMIC Quick Action Caliper is a quality tool without a rival.

Size 6". Graduation 1/40", vernier reading .001, catalog No. 21; graduation 1/40" and full mm, vernier reading .001 and 1/10 mm, catalog No. 22. Also AMIC precision Vernier Calipers, Height Gages, Depth Gages, Pocket Calipers, Precision Graduated Metal Scales.

Write for FREE Booklet A and price or telephone PEnnsylvania 6-0687

AMERICAN MEASURING INSTRUMENTS CORP.
240 WEST 40th ST. • NEW YORK 18, N. Y.



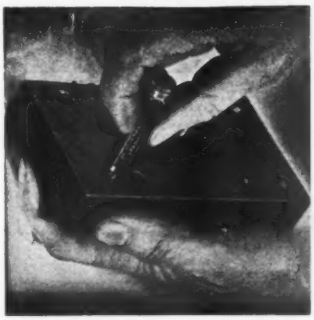
DYKEM STEEL BLUE *STOPS LOSSES*

making dies and templates

Simply brush on, ready for the layout in a few minutes. The dark blue background makes the layout lines show up in sharp relief, and at the same time prevents metal glare. Increases efficiency and accuracy.

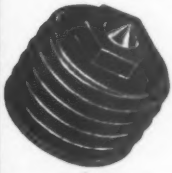
Write for full information.

THE DYKEM COMPANY
2303L North 11th Street — St. Louis, Mo.



A REAL HELPING HAND

It's a help that die makers, tool makers, machinery builders and general machinists have long sought—a more accurate and surprisingly faster way of transferring screw holes.



The Heimann Transfer Screw Set is a self-contained, complete tool. No wrenches or pliers are necessary. Made in 3/16" to 1" diameters.

Send for price list.

HEIMANN MFG. CO.
Dept T
Urbana, Ohio

CONTRACT TOOLING AND PRODUCTION

Illinois

PRESS BRAKE DIES
and Punching Attachments for All Makes of Press Brakes
DREIS & KRUMP MFG. CO.
7428 S. Loomis Blvd. Chicago 36, Ill.

DRESEL-BETZ CO.
Belleville, Ill.
Designers and Manufacturers of Tools, Dies, Jigs, Fixtures, Metal Stampings

KANKAKEE DESIGN CO.
Kankakee, Illinois—Phone 8725
Designers of Tools, Dies, Jigs, Fixtures, Gages and Special Machines
General Drafting and Detailing
Manufacturing Sources Available

Michigan

DAVIS TOOL AND ENGINEERING CO.
19250 Plymouth Road, Detroit, Michigan, VErmont 5-6000. Tools and Dies, Special Machinery, Sheet Metal Stampings and Assemblies

LINCOLN PARK MANUFACTURING CO.
3306 Dix Road, Lincoln Park, Mich., ATlantic 8111. Special high speed circular, dovetail, flat form tool bits. Small machines, jigs, gages and experimental parts. Regrinding and salvaging high speed flat form, special bits and small flat broaches. Attractive proposition for representatives.

Pennsylvania

ACE MANUFACTURING CORP.
127 E. Erie Ave., Philadelphia, Pa.
DElaware 6-4141
PRECISION GRINDING
Centerless, Internal, External, Blanchard and Thread Grinding
Tool & Dies—Metal Stampings—Assemblies

New York

AMERICAN MEASURING INSTRUMENTS CORP.
240 West 40th St., New York 18, N. Y. Jigs, fixtures, gages, dies, precision parts

CONRAD & MOSER
2-23 Borden Ave., Long Island City, N. Y. Machine Tools & Molds, Parts & Machines, Aluminum Cast Parts, Aluminum Sheet Formed Housings

RANE TOOL CO., INC.
17 Ross St., Jamestown, N. Y. Phone 7-175. Specialists in Blanking, Forming, and Drawing Dies

Ohio

PRESS BRAKE DIES
and punching-notching equipment
Engineering Service
THE CINCINNATI SHAPER CO.
HOPPLE ST. CINCINNATI 25, OHIO

CLEVELAND UNIVERSAL JIG COMPANY
13404 St. Clair Ave., Cleveland, O., MUlberry 2600
DESIGNERS AND BUILDERS
Jigs and Fixtures Special Machines
Production Engineering
Complete Plant Routing and Tooling

THE DENNING MANUFACTURING CO.
1775-81 E. 87th St., Cleveland, O., CEdar 0801
Designers and Builders of High Grade Dies

GENERAL DIE & TOOL CO.
2067 W. 55th St., Cleveland, O., WOodbine 4736
Dies, Tools, Jigs, Fixtures, Light Stampings, Special Machinery, Manufacturing

THE INDUSTRIAL MACHINE CO.
1436 East 47th St., Cleveland, O. Founded in 1908. Builders of Special Machinery. General Machine Work.

KIFFER TOOL & DIE CO.
5601 Tillman Avenue, Cleveland, Ohio, WOodbine 2440-2441. Manufacturers of Special Machinery, Tools, Dies, Jigs, Fixtures, Swiss Jig Boring

NOBLE & STANTON, INC.
998 Broadway, Bedford, Ohio, Bedford 1234.
Tool Makers—Short Run Production Work

PARAMOUNT TOOL CO.
1392-98 East 43rd St., Cleveland, O., ENdicott 2220. Jigs, Fixtures, Dies, Experimental Work

THE PHOENIX MACHINE CO.
2711 Church Ave., Cleveland, O., CHerry 1048. Contract Grinding, Boring and Planing. Lester-Phoenix Die Casting and Plastic Molding Machines

A. P. SCHRANER & CO.
3838 Payne Ave., Cleveland, O., HEnderson 8644. External Cylindrical Lapping Machines, Special Machinery, Tools, Dies, Jigs, Fixtures

THE VARIETY MACHINE & STAMPING CO.
12695 Elmwood Ave., Cleveland, O., LAkewood 8433. Designers and Manufacturers of Dies, Metal Stampings. 250 tons capacity

New Jersey

THE VIKING TOOL & MACHINE CORP.
6 Main Street, Belleville, New Jersey. Tools-Dies-Jigs-Fixtures-Molds-Gages-Machines-Stampings-Specialties

HARDNESS TESTING

has been done with the
SCLEROSCOPE
since 1907

•

THE SHORE INSTRUMENT & MFG. CO., INC.
9025 Van Wyck Avenue
Jamaica 2, N. Y.

The very best facilities for

STAMPINGS

In Small Lots

DAYTON ROGERS
Manufacturing Company
Minneapolis (7), Minn.

BLUE LAYOUT DOPE

Speeds layout on all metals. Dries fast. Oil resistant. Won't chip, crack or flake off. Comes in handy 8-oz. brush-in cans, pts., qts., drums. Order now! SAMPLE FREE!

TAMMS SILICA COMPANY
228-TD North La Salle St. ★ Chicago 1, Illinois

PRECISION TOOLS

Toolmakers DeLuxe Vises
1—2—3 Blocks
Whirlijig & Centers
5" Sine Bar
Edwalt Test Gauge

JOSEPH B. FAKES & COMPANY
1415 ETOWAH AVE. ROYAL OAK, MICH.

New Nesting Type
TOTE PANS
20" Long x 12" Wide x 6¼" Deep
16 Ga., drag holes, handles both ends.

J. L. LUCAS & SON, INC.
BRIDGEPORT 5, CONN.

BREAKDOWNS A SPECIALTY
Gears
ONE OR A MILLION
ROUND THE CLOCK SERVICE

• SPUR • WORMS • SPROCKETS • HELICAL
• BEVELS • RACKS • SECTORS • SPLINE

Metallic—Non-Metallic • ¼ to 72" in Diameter
"OVER 500 MACHINES TO SERVE YOU" • ASK FOR OUR EQUIPMENT LIST
A Few Sales Territories Available
UNIVERSAL GEAR WORKS INC. 13032 E. McNICHOLS DETROIT, MICH.

IN STOCK

SPECIAL THREAD TAPS & DIES. LEFT HAND TAPS & DIES. PLUG & RING THREAD GAGES. DRILLS, REAMERS, MILLING CUTTERS, END MILLS, ETC.
(*Send For Our Catalog*)

LAFAYETTE TOOL & SUPPLY CO.
128 LAFAYETTE STREET
NEW YORK 13, N. Y.

SOUTH BEND
LATHE COLLETS
Precision Steel and Brass Collets for use in any make of lathe or other machine that they will fit.

SPECIFICATIONS

Collet No.	Thread Dia. In.	Thread Length In.	Th'd's Per In.	Body Dia. In.	Collet Length In.	Head Dia. In.	Head Taper Deg.
3	.650	3/4	26	.6495	2-11/16	.852	12
2	.835	13/16	20	.8595	3-5/16	1.095	15
5	1.250	3/4	20	1.2495	3-9/32	1.452	10
4	.950	13/16	20	.9495	3	1.150	10

	No. 3	No. 2	No. 5	No. 4
STEEL COLLET	$3.75	$4.00	$4.75	$4.25
BRASS COLLET	2.00	2.25	2.50	2.35

SOUTH BEND LATHE WORKS 432A E. Madison St. South Bend 22, Ind.

"The Outstanding *Basic* Improvement in FLEXIBLE SHAFT Machinery in 25 Years"

GSY-5

The NEW Strand Rotoflex 4-speed gear drive Flexible Shaft Machine (shown upper right) is another step forward in Strand quality precision tools for faster, easier, more economical production work. The Rotoflex 4-speed gear drive employs a patented, new type of quick change gear drive utilizing 4 positive speeds by a unique and easy method of instantly changing from one speed to another. Rotoflex machines are powered with totally enclosed ball-bearing motors having speeds from 850 to 9000 R.P.M., depending on motor.

Standard type Strand machines, (lower right) give portable rotary power at constant speeds with dependable results in all grinding, buffing, drilling, wire brushing and rotary filing operations. Hundreds of types and models from ⅛ to 3 H.P. available with suitable attachments for your specific requirements.

Distributors in all principal cities
Ask for Bulletin No. 43 and Catalog No. 30

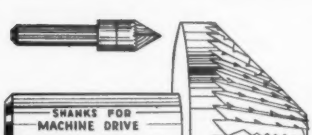
Strand FLEXIBLE SHAFTS

N. A. STRAND & CO.
5003 NO. WOLCOTT AVE.
CHICAGO 40, ILL.

M-5

INSIDE DEBURRING CUTTERS

HIGH SPEED STEEL



STANDARD ANGLES
30° - 45°
STOCKED IN 8 SIZES
EACH ANGLE

SPECIAL ANGLES FROM STOCK BLANKS

HANDLES FOR HAND USE (4 THREAD SIZES)

RADIUS TYPE 10 SIZES

WRITE FOR BULLETIN NUMBER 15-I

SEVERANCE TOOL INDUSTRIES INC.
730 IOWA STREET
SAGINAW, • MICHIGAN

PLEASE USE INFORM-A-GRAM FOR PRODUCT INFORMATION

HERCULES

THE PUNCH THAT CLICKS

IN THE STAMPING INDUSTRY

Hercules Retainers and Interchangeable Punches actually do "click" in the Stamping and Tool and Die Industries.

Reasons:

Punch locks securely and will not pull out of the retainer.

Punch can readily be moved from the retainer with a minimum of "down" time.

Punch will withstand the severest of strains and shocks.

Tool and Die Shops can incorporate Hercules Retainers and Punches into dies at a material saving in costs.

Experts in heavy and production stamping realize the advantages in using Interchangeable Punches —and further, recognize the Hercules as outstanding in this field!

1848 One Hundred Years of Fine Tools 1948

W&B

WHITMAN & BARNES

DETROIT

NEW YORK • CHICAGO • LOS ANGELES

Specify

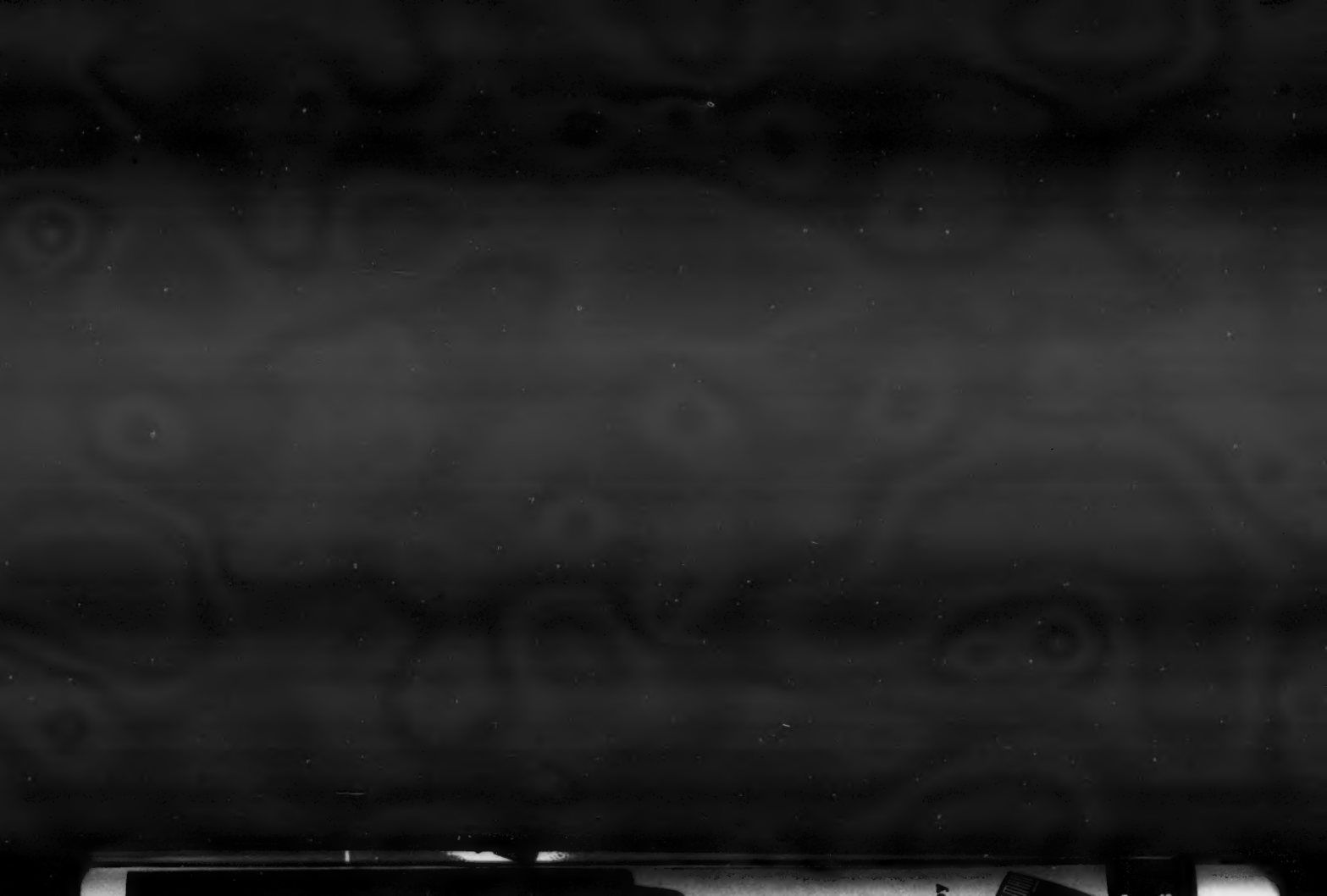
CULLMAN SPROCKETS for every purpose . . .

Speedy and efficient production depends upon your ability to get the parts you need quickly and economically.

When you specify Cullman Sprockets you designate a source specifically experienced and equipped to fill your needs in the shortest possible time and at reasonable cost.

Thousands of Cullman Sprockets are available for immediate delivery. Sprockets to your specifications can be made in minimum time because of the specialized methods and equipment used only in producing Cullman Sprockets. Quotations will be made promptly on sprockets to your specifications. A catalog listing Cullman Sprockets, and giving much valuable information for selecting and buying sprockets will be sent upon request.

Send for Your Copy

CULLMAN WHEEL COMPANY

1332 WEST ALTGELD STREET, CHICAGO 14, ILLINOIS